REPORT NO. ZW-28-052

ACTUAL WEIGHT AND BALANCE

PBY-5A #1 (GOVERNMENT NO. 2456)

CONTRACT 70496

October 17, 1941

BY

CHECKED

APPROVED

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INTRODUCTION

PBY-5A, article No.1, of contract 70496 (Government No.2456), built by Consolidated Aircraft Corporation, was weighed at the Consolidated plant at San Diego, California on October 10, 1941 in the presence of Mr. J. B. Kline and Mr. W. R. Bramson, Navy representatives.

With the floats retracted, weight empty weighings were made with the deck line level (tail up) and with the tail down.

Computations, pages 25 and 28 indicate the special load and useful load items in the airplane when weighed and the weight empty items missing during the weighing.

The report weight empty, pages 25 and 28, represent the revised contract weight empty status per authorized changes, pages 54-58.

Since the report weight empty includes self-sealing fuel cells, the fuel C.G.'s used in the various report useful loads are taken from the curve, page 65, showing the variation of fuel C.G. for self-sealing cells.

A curve showing the variation of fuel C.G. for the integral fuel tanks is included on page 66 to make possible C.G. calculations when self-sealing fuel cells are not installed.

Appendix I, page 64, shows in detail the weights and arms of items added and/or eliminated for (a) 50% vs 100% fuel protection and (b) no fuel protection nor armor vs 100% fuel protection and armor.

This appendix is added in accordance with the requirements of BuAer letter Aer-E-213 EM, C-70496, 046406 of August 4, 1941 (5915).

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GROUP WEIGHT STATEMENT

~~ESTIMATED~~ ~~CALCULATED~~ —ACTUAL

(Cross out those not applicable)

Model PBY-5A

Contract No. 70496

Airplane, Government No. 2456

Airplane, Contractor No. 1

Built by Consolidated Aircraft Corp.

Engine (model) P&W R-1830-82

Engine Government No. 5721 & 5748

Date 10/17/41

Changes incorporated in this airplane (Nos. of) Authorized Changes "A" through "AB" excluding F, L and X and changes to be accomplished in service.
See pages 54 - 58
Other modifications incorporated since the first airplane under this contract

Wright Field 10-1-36-8 Pgs.-5M ea.

AN-9103-B

Model PBY-5A

GROUP WEIGHT STATEMENT

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Page 3

			Landplane	Seaplane
Wing group,				4543.3
Wings,		4183.8		
Ailerons,		134.1		
Flaps,				
Struts and wires,		225.4		
Tail group,				516.4
Stabilizer,		268.6		
Elevator,		122.0		
Fin,		30.5		
Rudder,		95.3		
Struts and wires,				
Body group,				6684.1
Fuselage, less engine section,				
Alighting gear---land type,		1963.1		
Main landing gear,	1490.8			
Retracting mechanism, Main & Nose	195.7			
Nose XXXXXX landing gear,	276.6			
Retracting mechanism,				
Hull,		4260.9		
Alighting gear---water type,		460.1		
Main floats,				
Main float bracing,				
Auxiliary floats (Disp. 3240 lbs.),	180.0			
Auxiliary float bracing,	198.2			
Retracting mechanism,	81.9			
Engine section or nacelle group,				496.8
Power plant group,				5500.5
Engine (as installed), P&W R-1830-82		2925		
Engine accessories,		282.5		
Power plant controls,		110.0		
Propeller, Hamilton F.F.12'3 -Blade (2)		*818.4		
Starting system,		117.6		
Cooling system,				
Radiator and shutters,				
Liquid,				
Piping, etc.,				
Lubricating system,		224		
Tanks,				
Piping, etc.,				
Fuel system, (Incl. Leakproof Fuel Cell Instal.)		1224.6		
Tanks,				
Piping, etc.,				
TOTALS (To be brought forward)				17741.1

*Includes Governors (12.5#) and anti-icer provisions (12.9#)

		LANDPLANE	SEAPLANE
Fixed equipment,			2678.9
Instruments,	125.7		
Surface controls,	422.3		
Furnishings,	1234.2		
Communicating, (Army),			
Electrical,	776.1		
Anchor, towing and hoisting gear,	120.6		
Arresting hook installation,			
Emergency flotation gear			
TOTALS (from page 2),			17741.1
WEIGHT EMPTY,			20420.

USEFUL LOAD — 785 GAL. PATROL / 1191 GAL. PATROL / 500 GAL. BOMBER / 1000 GAL. BOMBER

	[redacted]	[redacted]	[redacted]	[redacted]
Crew, & Parachutes	1400	1400	1400	1400
Fuel, (gals.),	4800	7236	3090	6090
Oil, (gals.),	375	562.5	262.5	450
Armament,	971.2	971.2	3111.1	3111.1
Fixed gun and installation,				
Flexible gun and installation,	(755.8)		(755.8)	
Bomb and installation,			(2139.9)	
Torpedo and installation,				
Pyrotechnics,	(215.4)		(215.4)	
Equipment,	1272.3	1272.3	1272.3	1272.3
Communicating (Navy),	(348.1)		(348.1)	
Navigating,	(56.8)		(56.8)	
Miscellaneous,	(867.4)		(867.4)	
USEFUL LOAD,	8818.5	11442.	9135.9	12323.4
WEIGHT EMPTY,	20420	20420.	20420.	20420.
GROSS WEIGHT,	(29238.5) 29239.	31862	(29555.9) 29556.	(32743.4) 32743

UNIT WEIGHTS

Wing group (net area = 1400), lbs. per sq. ft.	3.25
Tail group (net area = 280), lbs. per sq. ft.	1.84
[Submerged displacement main float or hull (142295.) / Weight of main float and bracing (4260.9)]	33.4
Weight of cooling system per normal H. P. (H. P.)	
Weight of lubricating system per gal. oil cap. (110 Gals. of oil)	.204*
Weight of fuel system per gal. cap. (1206 Gals.)	1.015

*Piping, etc. does not include weight of main oil tanks which are included under nacelle group

**1206 gals. of fuel represents total capacity of Goodyear self-sealing fuel cells 1191 + 15 gals. (Aux. Pwr. Unit) = 1206 gallons

DETAIL WEIGHT STATEMENT

~~ESTIMATED~~ ~~CALCULATED~~ ACTUAL

(Cross out those not applicable)

Model PBY-5A

Contract No. 70496

Airplane, Government No. 2456

Airplane, Contractor No. 1

Built by Consolidated Aircraft Corp.

Engine (model) P&W R-1830-82

Engine, Government No. 5721 and 5748

Date 10/17/41

Wright Field 10-1-36-19 Pgs.-4M ea.

DETAIL WEIGHT STATEMENT
SUMMARY

	LANDPLANE	SEAPLANE
Wing group,		4543.3
Tail group,		516.4
Body group, (Incl.landing gear & retracting Mech.)		6684.1
Engine section or nacelle group,		496.8
Power plant group,		5500.5
Fixed equipment group,		2678.9
WEIGHT EMPTY,		20420.0
USEFUL LOAD, 785-gal.-Normal Patrol		8818.5
GROSS WEIGHT,		(29238.5) 29239.

WING GROUP

	PANELS				AILERONS		Flaps	Struts and Wires
	Upper Center	Upper Outer (2)	Lower Center	Lower Outer ( )	Upper (2)	Lower ( )		
Beams—front,	256.1	136.5			25.6			
—intermediate,								
—rear,	218.3	113.7						
~~xxxxxxx~~ Stringers	268.0	242.3						
Ribs, & Bulkheads	296.4	134.4			14.6			
Wing Tip Box		26.6						
~~xxxxxxxxxxxx~~ T.E.Assy.	171.1	70.0			7.8			
~~xxxxxxxxx~~ L.E.Assy.	240.6	214.3			43.1			
~~xxxxxxxxx~~ Armor Plating Fuel Protection	89.1							
Fittings,	136.8	34.5			2.8			
Fuel Cell Access Doors	66.4							
Gussets,	65.9	37.3						
Control horns,								
Instal. prov. for—fuel ~~xxxxx~~ tanks,	225.2							
—armament,								
—flotation gear,								
—main landing gear,								
—engine nacelles,	85.3							
—electrical equip.,								
—aux. power devices,								
—de-icing equipment,	40.5	5.3						
Shock Absorbing Stops					.2			
Rivets, bolts, nuts, etc.,	36.5	22.0			3.3			
Fabric covering and dope,					25.5			
Metal covering,	455.5	326.7						
Paint and protective coatings,	20.0	30.0						
Inspection windows and frames,	6.1	7.1						
Walkways,	8.8							
Aileron Cut-Out		66.3						
Fairing,	7.5							14.8
~~xxxxxxxxx~~ Corrosion Inhibi-tor	1.2							
Leading edge airfoil complete,								
Trimming tabs,					3.5			
Bolt Attaching	17.0				.3			7.8
Balance weights,					7.4			
Hatches and working platforms,								
Hoisting and mooring,								
Miscellaneous		4.5						
Struts—external,								202.8
Wires—external,								
Anti-vibration devices,								
SUBTOTALS,	2712.3	1471.5			134.1			225.4
TOTALS,		4183.8			134.1			225.4
TOTAL WING GROUP,				4543.3				

TAIL GROUP

	Stabilizer	Elevators No. 2	Fins No.	Rudders No. 1	Struts and Wires
Beams—front,	14.8	19.8	2.8	9.3	
—rear,	22.1		4.1		
-Auxiliary		1.3			
Leading Edge Assy.	37.5				
Ribs, & Bulkheads	11.2	18.7	5.9	16.3	
Stringers	26.3				
Trailing Edge Assy.		1.5		0.7	
Drag struts or ribs,					
Drag wires,					
Fittings,	4.2	2.7		2.1	
Tab Spar				0.9	
Gussets, & Miscellaneous	10.6	7.9	2.3	2.5	
Control horns, & Torque Tubes		12.6		4.1	
Instal. prov. for—flotation,					
—de-icing equipment,	0.8				
—electrical equipment,					
Rudder Tab				2.7	
Upper Cap Assembly				2.0	
Lower Cap Assembly				2.5	
Rivets, bolts, nuts, etc.;	7.8	8.7	2.6	5.2	
Fabric covering and dope,		17.8	1.0	14.3	
Metal covering,	35.6	18.9	11.8	12.7	
Paint and protective coatings,	4.0				
Walkways,					
Steps and grips,					
Fairing,	14.8				
Trimming tabs,		4.2			
Stabilizer Tips	55.6				
Stabilizer Center Section	23.1				
Balance weights,		6.0		18.4	
Housing Elevator Crank		1.9			
Inspection Doors	0.2				
Leading edge protection strips,					
Rudder Lock				1.6	
Struts—external,					
Wires—external,					
Anti-vibration devices,					
SUBTOTALS,	268.8	122.0	30.5	95.3	
TOTALS,	390.6		125.8		
TOTAL TAIL GROUP,	516.4				

Wright Field 10-1-36-19 Pgs.-4M ea.

	FUSELAGE		Hull or Main Floats	Aux. Floats
	Frame	Monocoque		
~~xxxxxxxxx~~ Longerons			13.7	
~~xxxxx~~ Armor Plating at Bow Gun-Est.			53.9	•
~~xxxx~~Armor Plating at Bulkhead #5-Est.			18.3	•
~~xxxxxxxxxxxxx~~Armor Plating at Blister Turrets,etc.			111.9	•
~~xxxxxxxxxxxxx~~Armor Plating at Tunnel Gun-Est.			117.8	•
Turn over protection (if not integral),				
Wing stubs (if integral),				
Tail stubs (if integral),				
Catapult fittings,				
Other fittings,			270.2	8.0
Rivets, bolts, nuts, etc;			57.8	7.0
Gussets, (Hull-Incl.with their respective instals.)				2.3
Instal. prov. for—fuel~~xxxxxxx~~			2.5	
—Bombing,			10.3	• }
—gunnery,			3.4	• }
—torpedo,			1.2	• }
—pyrotechnics,			0.4	•
—~~xxxxxxx~~ Portable Compass			0.2	
~~xxxxxxxxx~~, De-icing			13.1	
~~xxxxxxxxx~~, AEL-1 Units			2.9	
—life raft,			0.2	
—flooring, (Incl.under flooring)				
~~xxxxxxxxxxxxx~~ Anti-icer			0.5	
—electrical,				
(1) radio,			13.6	
(2) power,			3.9	
(3) miscellaneous,			0.4	
—passengers and cargo,				
—living quarters,				
(1) sleeping,				
(2) messing,			7.3	
(3) toilet and miscellaneous,				
—heating,				
—ventillating,			3.6	
—supercharging,				
—hoisting, handling and mooring,				
Instrument Panels			4.3	
Longitudinal stringers, - Deck			159.9	17.1
- Bottom			172.0	5.8
Circumferential stiffeners, -Beltframes			280.8	5.7
Miscellaneous			1.6	1.8
Bulkheads, Watertight			314.1	35.8
Non-watertight			247.9	
Plating~~xxxxxxxx~~, Icer Guards			6.7	
—bottom,			332.8	15.6
—side and deck,			413.1	36.8
TOTALS (to be brought forward),			2640.3	135.9

BODY GROUP (Cont'd)

	FUSELAGE		Hull or Main Floats	Aux. Floats
	Frame	Monocoque		
Keel and rubbing strip,			52.5	5.5
Centerline bulkhead,			63.1	6.1
Chine and spray strip,			31.0	9.5
Step assembly,			10.2	
Sternpost and fittings,				6.1
Access plates, handhole frames and covers,				5.5
Seaplane recovery hook fitting,				
Water tight doors (No. 4),			26.3	
Nose bumper,			3.6	4.3
Fabric covering and dope,				
Metal cowling,				
Aux. Keel-Sta. #4-#5			89.2	
Turtleback, fairing strips, etc.,				
Fairing ~~and fillets~~ Tail			18.8	1.1
Nose Wheel Door & Controls			95.4	
Enclosures and windshields—pilot,			78.1	
—bow gunner,			91.1	
—middle gunner,			177.0	
—stern gunner,				
Superstructure & Fairing			105.1	
~~Salvo Release Signal~~			3.4	
Windows and ports,			38.4	
Hatches and doors,			66.6	
~~Inspection door~~ Deck Structure			13.2	
Walkways—external,				
Flooring, Walkways, Supports, Steps, etc.			188.7	
Headrest,				
Steps, grips, guard rails, chocks, etc.;			14.1	
Center Fin Structure			88.6	
Twin Keel-Nose			27.6	
Paint, protective coatings, water-stop material,			63.0	6.0
Heat and sound insulation,				
Main Wheel Well			220.6	
Nose Wheel Well			55.0	
Water rudder and controls,				
Float retracting mechanism, (Crank for manual float)				
Retracting Operation incl. in Starting System				81.9
Structural Attaching Parts			~~XXX~~	5.6
External struts—float,				90.6
~~External~~ float, Brace Struts				102.0
TOTALS (from page 5),			2640.3	135.9
TOTALS,			4260.9	460.1
TOTAL BODY GROUP, SEAPLANE,			4721.0	

	Main Landing Gear	Nose Landing Gear
Main landing gear,		
Main struts,	129.4	
Upper Vee Strut	86.2	
Lower Vee Strut	102.8	
Wires,		
Axle,		
Shock absorber unit complete, including Brakes & Operating Mech.	610.0	
Wheels, (size 47"), }	486.0	
Tires and tubes, (size 47"), }		
Brake operating mechanism,		
Parking brake control,		
Fittings,		
Bolts, nuts, etc.,	52.0	
Fairing,		
Paint and protective coatings,		
Retracting mechanism, for both nose & main gear	195.7	
Bumper Arm and Spring	17.03	
Latch & Latch Release	7.43	
Nose landing gear,		
Wheel, including brake (Size 30"),		27.9
Tripod or support assembly,		
Tire & Tube		54.1
Shock absorber unit complete, including Strut Assembly		179.7
Brake operating mechanism,		
Locking mechanism,		
Steering controls,		
Bolts, nuts, etc.,		14.9
Fairing,		
Paint and protective coatings,		
Retracting mechanism,		
Skids or bumpers,		
TOTALS,	1686.5	276.6
TOTALS (from page 6)	4721.0	
TOTAL, BODY GROUP—LANDPLANE,	6684.1	

	WEIGHT
Engine mount, Structural Mount	64.8
Pedestal Type Mount - G.F.M.	42.4
Oil Tank-Monocoque	169.2
Fittings,	
Vibration absorbing devices,	
Firewall (if not integral),	9.5
Metal cowling, including inspection doors,	37.8
Cowl formers and supports,	
Engine ring cowl and flaps,	132.4
Oil Cooler Ducts	11.3
Oil Cooler Pad	1.8
Engine nose cowl and shutters,	
Fairing,	
Instal. prov. for maintenance;	
(1) steps and grips,	
(2) working platforms,	
(3) hoisting prov.,	
Supports for—oil coolers,	3.1
—oil tanks,	
Provisions for de-icing	6.2
Oil cooler shutters,	
Air ducts~~XXXXXXXXXX~~ magnetos, etc.,	4.8
Rivets, bolts, nuts, etc.,	10.8
Paint and protective coatings,	2.7
Engine nacelle struts,	
Engine nacelle wires,	
TOTAL, ENGINE SECTION OR NACELLE GROUP,	496.8

Wright Field 10-1-36-19 Pgs.-4M ca.

POWER PLANT GROUP

Engine Model (R-1830-82)	Engine	Engine Accessories	Power Plant Controls	Propeller	Starting System
Engine as installed (No. 2),	2915.				
Engine accessories, Supercharger, complete with drive, blower, intercooler, and piping (If not integral with engines),					
Exhaust collector or stacks,		88.3			
Exhaust collector shroud,					
Air intake system,		82.5			
Autom. oil temperature control valve,		9.5			
Oil cooler, (12")		79.4			
Vac. pump and separator (No. 2),		18.4			
Fuel pump (engine driven)		4.4			
Power plant controls—for					
Spark, throttle and mixture,			36.7		
Supercharger,					
Pre-heater,			2.3		
Oil cooler shutters,					
Engine cowl shutters,					
Radiator shutters,					
Ring cowl flaps,			9.3		
Pitch adjusting mechanism,			1.7		
Prop.(F.F.Pumps,Motors,Cables,etc.)			60.0		
Propeller (Dia.: 12'0"),				793.0	
Blades (No.),					
Hub,					
Spinner,					
Pitch adjusting mechanism,				12.5	
Synchronizer,					
Instal. prov. for de-icing equipment,				12.9	
Starting system,					
Starter (Type (2) Eclipse Series)					98.0
Crank (No. 2),					4.2
Crank extension, (1)					3.1
Starter controls,					1.5
Primer,					3.6
Primer piping					
Supports,Universals,Joints,Etc.					7.2
Silencing devices,					
TOTALS,	2925.	282.5	110.0	818.4	117.6
TOTAL (to be brought forward),	4253.5				

	Cooling System	Lubricating System	Fuel System
Radiator,			
Radiator shutters,			
Expansion tank,			
Cooling system supports,			
Liquid in			
Engine,			
Radiator,			
Expansion tank,			
Piping,			
Oil cooler or regulator,			
Total liquid,			

	NUMBER AND LOCATION	Capacity (Gals./tank)			
Oil tanks—main,					
Oil tanks—aux. P. P.,					
Fuel tanks—wing,*					1065.
Fuel tanks—fuselage,*					
Fuel tanks—aux. P. P.*,					
Mechanical fuel pump (not directly attached to engine),					
Hand fuel pump,					11.5
Hand fuel pump controls,					1.4
Valves,				3.4	10.5
Strainers,					0.3
Piping, Fittings, etc.				19.0	119.8
Vents, & Guards					9.6
Provisions for CO_2 Purging System					3.5
Refuel installation,					
Tank supports and padding,					
Dump valve and controls,					
Tank release and controls,					
Water Drain & Controls					1.1
Misc. Valve Controls					1.9
*incl. sight gage (if integral) or hydrostatic cell					
TOTALS,				22.4	1224.6
TOTAL (from page 9),					4253.5
TOTAL POWER PLANT GROUP,					5500.5

FIXED EQUIPMENT GROUP—INSTRUMENTS
(List instruments on blank lines, if not given below)

	No.	WEIGHT
Accelerometer,		
Airspeed indicator,	4	2.7
Pitot static tube, & Supports	1	2.7
Altimeter,	5	5.3
Artificial horizon indicator	2	8.6
Automatic pilot (gyro, speed control and mounting units),		
Clock, (2 Elapsed Time & 1 Standard)		2.1
Compass, Mk.IX	2	5.8
Directional gyro indicator	2	7.3
Inclinometer,	2	0.4
Rate of climb indicator,	2	1.7
Turn indicator,	2	2.6
Vacuum pump regulating valve,	2	1.5
Venturi tube,		
Fuel Quantity Gage Shut-Off Valves	2	2.5
Air Thermometers	3	3.1
De-icer Pressure Gage	1	0.3
Carburetor air thermometer,		
Engine gage unit,	2	3.5
Fuel flow meter,	2	9.0
Fuel quantity gage,		5.1
Fuel—air ratio analyzer,		
Manifold pressure gage,	4	3.8
Oil quantity gage (if not integral with tank),	2	5.5
Oil thermometer,		
Tachometer generator Indicator	2	13.6
Tachometer synchronizer,	1	0.5
Thermocouple equipment,	2	6.3
Vacuum Gage	1	0.3
Z.A.Instal.Landing Equipt.		
Sectional Radio Transmission Lines & Couplings for/		5.5
Tubing—for		
Airspeed indicator,		7.7
Altimeter,		0.5
Artificial horizon indicator,		0.3
Directional gyro indicator,		0.4
Turn indicator,		0.5
Engine gage unit,		3.0
De-icer Pressure		0.8
Manifold Pressure Gage		3.6
Bolts, clips, etc.,		9.2
TOTAL, INSTRUMENTS		125.7

FIXED EQUIPMENT GROUP—SURFACE CONTROLS

	WEIGHT
Control stick or column (pilot), }	27
Control stick or column (assist. pilot), }	
Connecting members for above,	
Supports (removable),	
Rudder pedals, including brake system (pilot), }	27
Rudder pedals, including brake system (assist. pilot), }	
Supports (removable),	

	Aileron	Elevator	Rudder	
Cables,	13.1	11.7	14.3	
Rods,	15.3	2.5		
Pulleys,	2.5	6.3	5.1	
Bell cranks,	6.0	3.9		
Fair leads, or guides,	1.0	0.7	0.7	
Supports (removable),	21.8	15.6	22.0	
Struts, or wires (to interconnect control surfaces),				
Bolts, etc.,	1.7	0.9	2.1	
Totals,	61.4	41.6	44.2	147.2

Misc. controls,	Servo Unit	Oil Pump and Tank	~~Supts~~ Pulleys & Cables	Elec. ~~Rods~~ Equip.	~~Misc.~~	Operating Motors, Etc.	
Stabilizer adjustment,							
Elevator tabs,							15.6
Rudder tabs,							14.3
Aileron tabs,							14.2
Wing slats,							
Booster pilot (Army),							
Wing flaps,							
Automatic pilot,			10.6 3.9	11.	1.7	143.0	170.2
Aileron droop,							

Surface control parking locks (if not removable),	8.8
Bolts, etc.	
TOTAL, SURFACE CONTROLS	422.3

	WEIGHT
Seats and adjusting mechanism,	
Pilot, - Armor Plated	310.1
Assist. pilot, Armor Plated	
Gunner,	
Mechanic,	10.
Radio operator,	12.6
Navigator,	9.5
Bomber,	5.2
Chairs (No.),	
Litters and supports (No.),	
Observers & Supports	7.7
Misc. equipment, Mechanic's & Observers	
Seat or back cushions ~~XXXXXXXXX~~ Pilots, Navigator's, Radio Operator's	34.1
~~XXXXXXXXXXXXXXXXXXXXXXXXXX~~ Tunnel Gunner's Safety Cable	1.5
Safety belts—pilot (No. 5),	14.4
—gunner (No. 4),	11.3
~~XXXXXXXXXX~~ (No. 4), Bunk Safety Belts	4.9
Instrument boards—pilot,	7.7
—others,	8.1
Brackets for detachable parachutes (No. 7),	2.8
Tool locker,	12.3
Toilets and relief tubes, & Toilet Bag Stowage	8.6
Bilge pump ~~and~~ hose ~~XXXXXXXXXXXXXXXXXXXX

	WEIGHT
Covers, floor coverings, etc.,	
Fabric cockpit covers,	
Engine covers,	
Propeller hub covers,	
Floor coverings (carpets, etc.),	
Upholstery,	
Curtains, - Pilot's & Navigators	4.2
Draft screen,	3.9
Knee Pads	0.5
Rations and personal equipment,	
Lockers for—food, (2)	20.3
—personal effects,	
Water containers, (4)	17.0
Cooker,	
Cooking ~~table and sink~~ stove & percolator	10.3
Refrigerator,	
Fire extinguishers,	
Engine, including piping and controls, (1)	31.6
Closed fuel compartments, including piping and controls.	
Portable carbon dioxide, (1)	16.6
Other portable extinguishers,	
Hand fire extinguisher (3)	19.9
Radio installation,	
~~Lockers~~ Misc. Radio	0.9
Lockers—spare parts,	
Tables, & Lockers	17.7
~~Shelves~~, Brackets-Radio Coil Boxes	2.8
Antenna posts, masts or loops,	1.1
Standpipe & Plug	3.3
Standpipe Plug Stowage	0.2
Prov. for Interphone	2.1
Navigation installation,	
Lockers, Octant & Binocular Stowage	4.0
Tables, & Drawer	31.4
~~Shelves~~ Watch Stowage	0.9
Map cases and report holders,	0.9
Book & Paper Stowage	4.9
Portable Compass Provision	1.0
Pelorus Drift Sight-Brackets & Supports	1.4
Mk. VII Driftsight Prov.	3.2
Protractor Stowage	0.3
TOTAL (to be brought forward)	200.4

	Bow	Middle	Stern	WEIGHT
Fixed and flexible guns installation,				
Gun charging levers and cable installation (remote),				
Ammunition shell and link ejection and feed chutes,				
Ammunition boxes,				22.1
Blast tubes,				
Rounds counters,				
Fixed gun mounts,				
Flexible gun mounts (seats if attached),	10.0	19.0	9.7	38.7
Magazine posts or holders,				
Gun latches,				
Gun Stowages				1.8
Control Yoke Boots NOT ARM.				0.6
Windshield Washer NOT ARM.				5.3
Bombs and torpedo installation,				
Release handles,				2.9
Cable installations,				35.0
Emergency release system,				5.4
Fuse locker,				
Operating mechanism for bomb doors,				
Bomb sight ~~installation~~ cover				5.4
Bomb Hoist Equipment				0.3
Torpedo Director Supports (Removable)				1.4
Torpedo Slings				12.8
Pyrotechnics installation,				
Signal pistol holder,				0.4
Signal ammunition holder,				2.3
Parachute flare holders, racks and release mechanism,				38.4
Smoke candle (grenade) handle,				0.4
Float light rack ~~or release mechanism~~,				3.1
Flashlight bomb installation,				
Smoke Candle Containers				0.3
Smoke Candle Handle Stowage				0.2
(45.1)				
Stewart-Warner Heating System				145.0
Photographic installation,				
Potassium Chromatic Containers				2.5
A.F.C. Cover				6.6
Instal. prov. for smoke tanks and release mechanism,				9.8
Mk. VII Target Reel Prov.				3.3
Attitude Control Device				6.6
Instal. prov. for oxygen equipment,				65.0
De-Icer Distributing Valve				11.5
Boot Air Separator				1.8
TOTAL, (brought forward from pages 13 and 14)				805.3
TOTAL FURNISHINGS,				1234.2

	WEIGHT
Generators, Type NEA-2D (2)	82.1
Generator control boxes, (2)	12.6
Generator cut-outs, (2)	5.1
Generator Supports	6.8
Auxiliary power plant ~~xxxxxxxxxxxxxxxxxxxxxxxxxxxx~~, & Muffler-Type NEP	128.0
A. C. converter, rectifiers and transformer,	
Batteries, Type S-34 (2) Type S-17 (2)	126.8
Battery ~~xxxxxxxx~~, Retaining Bolts & Supports	2.7
~~Voltmeter and~~ selector switch, Type B-1	1.0
~~Filters~~ Ammeter & Voltmeters	2.2
Lights—running,	1.2
—~~identification~~. Formation	3.3
—landing,	13.7
—instrument,	0.5
—interior, fixed,	5.3
—interior, portable with extension cords,	
-anchor light	1.3
Wiring (lighting, retracting mechanisms, radio, armament, etc.),	162.8
Conduit, & fittings	108.5
Switches,	11.0
Rheostats,	1.4
Connector panels, or fuse blocks,	
Hoist Motor Switch	11.9
Power Terminal Boxes	12.6
Junction boxes (electrical),	34.8
Provisions for De-Icing	6.4
Torpedo Release Installation	3.1
Distribution panels,	8.9
Retracting mechanism for landing lights,	
Signal device for retractible ~~landing gear~~, Floats	3.4
Plug at Firewall	6.5
Formation Bomb Release Signal	3.8
Ignition switches ~~and operating mechanism~~	1.0
Booster magneto, or coil and control (if not integral with starter),	
Tape, Terminals & Miscellaneous	14.2
Clips, bolts, etc.,	
TOTAL, ELECTRICAL,	776.1

	Anchor, Towing, and Hoisting Gear	Arresting Hook Installation	Emergency Flotation Gear
Anchor, towing and hoisting gear,			
Anchor,	31.8		
Anchor line,	16.0		
Pendant and clamp fitting,	9.7		
Lizard,	1.2		
Sheaves,			
Winch complete, & anchor housing	33.4		
Winch crank,			
Anchor handling rig or davit,			
Winch engine or motor,			
Hoisting sling (Navy),	24.5		
Wing handling lines,			
Quick Release Device	4.0		
Arresting hook installation,			
Trailing hook,			
Retrieving gear,			
Bumper,			
Emergency flotation gear,			
Bags and attached supports,			
CO^2 cylinder and valve,			
CO^2 charge,			
Manual release system,			
Actuators and tubing,			
CO^2 piping,			
Door release installation,			
Bag containers (if not built-in),			
Bag container doors,			
TOTALS,	120.6		
TOTAL (from pages 11, 12, 15, 16 and 17)	2558.3		
TOTAL, FIXED EQUIPMENT	2678.9		

SPECIAL EQUIPMENT

(Special equipment, furnished by the contractor, which may be carried in or on the airplane although not a part of the normal gross weight, shall be listed on this page).

	Beaching Gear	De-Icing Equipment	Miscellaneous Special Equipment
Beaching gear,			
Front ~~chassis~~ Assembly (2) no water	650.0		
Wheels and tires (front chassis),			
Rear ~~chassis~~ Assembly (1)	63.5		
Wheels and tires (rear chassis),			
Steering handle,			
Flotation tanks,			
Ballast,			
De-icing equipment—for,			
Wing group,			
Leading Edge Boots		56.1	
Fairing Strips & Attach.Parts		19.0	
Tail group,			
Leading Edge Boots		19.0	
Fairing Strips & Attach.Parts		8.0	
Power plant group,			
Miscellaneous special equipment,			
Propeller hoist, & Tackle			19.0
Special bomb loading platforms, (2)			53.5
Bomb hoist (if not built in),			
Engine maintenance platforms,			
Hoisting sling (Army),			
Surface control locking devices (if removable), (cont.Yoke)			2.8
Life raft, (Army),			
Engine Covers (2)			31.0
Propeller Hub Covers (2)			2.4
Pilot's Enclosure Cover (1)			15.0
Engine Hoist (1)			78.0
TOTALS,			
TOTAL, SPECIAL EQUIPMENT,			

MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052
(OA-10)

Weight & Balance Summary of Weight Empty and Gross Weight

	Weight	Arm Aft		% MAC	Arm Above	
		Horiz. Ref. Line	L.E. M.A.C.		Vertical Ref.Line	Deck Line
Weight Empty	20420	245.1	41.2	24.9	110.1	10.1
Gross Weight Functional Crew						
785 gal. Patrol	29239	250.1	45.7	27.6	109.0	9.0
1191 gal. Patrol*	31862	250.7	46.3	28.0	112.5	12.5
500 Gal.Bomber(2) 1000# Bombs	29556	248.9	44.5	26.9	107.5	7.5
500 gal. Bomber (4) 1000# Bombs	31556	248.9	44.5	26.9	108.4	8.4
500 Gal. Bomber (12)100# Class (116#) Bombs	29078	249.7	45.3	27.4	107.2	7.2
1000 gal. Bomber (2) 1000# Bombs	32743	250.3	45.9	27.8	111.6	11.6
500 gal. Torp.(2)Mk.XIII Tor.	31610	248.9	44.5	26.9	108.8	8.8
500 Gal.Bomber less Bombs ammunition & fuel	23968	244.1	39.7	24.0	103.4	3.4
785 gal. Patrol including smoke tank Install(not normal Load)	30281	250.0	45.6	27.6	109.3	9.3
Gross Weights-Battle Crew						
785 gal. Patrol	29239	252.7	48.3	29.2	109.4	9.4
1191 Gal. Patrol*	31862	253.1	48.7	29.5	112.9	12.9
500 gal. Bomber (2)1000#Bms.	29556	251.5	47.1	28.5	107.9	7.9
500 gal.Bomber(4)1000# Bombs	31556	251.4	47.0	28.4	108.8	8.8
500 gal.Bomber(12)100# class (116#) bombs	29078	252.4	48.0	29.0	107.6	7.6
1000 Gal.Bomber (2)1000#Bms.	32743	252.7	48.3	29.2	112.0	12.0
500 Gal.Torp.(2) Mk.XIII Torp.	31610	251.4	47.0	28.4	109.2	9.2
500 Gal.Bomber less Bombs, ammunition and fuel	23968	247.2	42.8	25.9	103.9	3.9
785 gal.Patrol incl.smoke tank install(not normal load)	30281	252.5	48.1	29.1	109.7	9.7
Most forward flying C.G.	24208	243.2	38.8	23.5	103.7	3.7
Most aft Flying C.G.	31782	253.7	49.3	29.8	113.0	13.0

BY

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Weight & Balance Summary of Weight Empty and Gross Weight (contd)

* 1206 Gals. of fuel represents total capacity of Goodyear self-sealing fuel cells

Crew Functional	Crew Battle
Pilot	Bomber
Co-Pilot	Pilot
Navigator	Radio Operator
Radio Operator	Mechanic
Mechanic	Waist Gunners (2)
Bunk Station 5-6 (2)	Tunnel Gunner

Reference Dimensions

Horizontal reference line forward L.E. wing	=	199.95"
Horizontal reference line forward Station #4	=	228.75"
Vertical reference line below deck line	=	100.00"
M.A.C. (from report "Equivalent Semi-Wing & Structural Mean Chord" of June 10, 1935)		165.32
L.E. of M.A.C. aft L.E. of wing		4.44
L.E. of M.A.C. aft of Horizontal reference Line		204.40

BY

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MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

ACTUAL WEIGHT EMPTY - Horizontal C.G.

	Weight	Horizontal Arm	Horizontal Moment
As Weighed:			
Main Reaction	15968.0	273.2	4362458
Nose Reaction	2534.5	68.0	172346
	(18502.5)	(245.1)	(4534804)
Less: Special Load Items in Airplane During Weighing			
De-icer shoes & fairing			
Wing	- 75.0	204.0	- 15300
Tail	- 27.0	656.0	- 17712
Anti-icer fluid (2 gals.)	- 14.0	232.0	- 3248
Purging System-Removable Part	- 27.0	314.0	- 8478
Dump Valve & Controls (2)	- 11.0	265.0	- 2915
	[-154.0]	[309.4]	[- 47653]
Less: Useful Load Items in Airplane During Weighing			
Mk.XXXV-6 Bomb Rack (4) & Mk. XVII-1 Solenoids (4)	- 98.7	250.0	- 24675
Bomb Chocks (2 sets)	- 11.5	250.0	- 2875
Antenna & Insulators	- 6.9	270.0	- 1863
Radio Direction Finder Installation	-15.8	210.0	- 3318
Interphone Installation (less microphones & Headset)	- 34.1	190.0	- 6479
Residual Oil	- 83.0	208.0	- 17264
	[-250.0]	[225.9]	[- 56474]
Plus: Weight Empty Items Not Installed in Airplane During Weighing:			
Fuel Cells & Installation (10)	1309.0	269.0	352121
Mechanic's Knee Pad	0.5	245.0	123
Self-Sealing Fuel Lines	35.0	228.0	7980
Oxygen System-Additions	20.0	227.0	4540
Torpedo Hoisting Sling-Additions	3.0	251.0	753
Revolving Circular Windshield Lock	1.5	15.0	23
Stewart-Warner Heating System	145.0	249.4	36163
Brake Cable Guard	1.5	125.0	188
Automatic Flight Control (G.F.M.Items)	(143.0)	(53.6)	(7659)
Rudder Motor	24.2	53.0	1283
Elevator Motor	24.2	67.0	1621
Aileron Motor	24.2	85.0	2057
Banking Motor	8.0	69.0	552
A.F.C.Gyro	19.5	77.0	1502
Bombsight Stabilizer	42.9	15.0	644
Armor Plating & Attaching Parts-Est.Wts.	(663.0)	(263.3)	(174596)
Armor Plating at Tunnel Gun	117.8	539.0	63494
Armor Plating at Waist Gun Turret	111.9	426.0	47669
Armor Plating for Fuel Protection	107.4	285.8	30695
Armor vs Original Seats (2) Pilot's = 310.1# vs 38.1# = 272.0#	272.0	116.0	31552
Armor Plating at Bow Gun	53.9	22.0	1186
	[2321.5]	[251.6]	[584146]
Total Weight Empty	20420.0	245.6	5014823

BY

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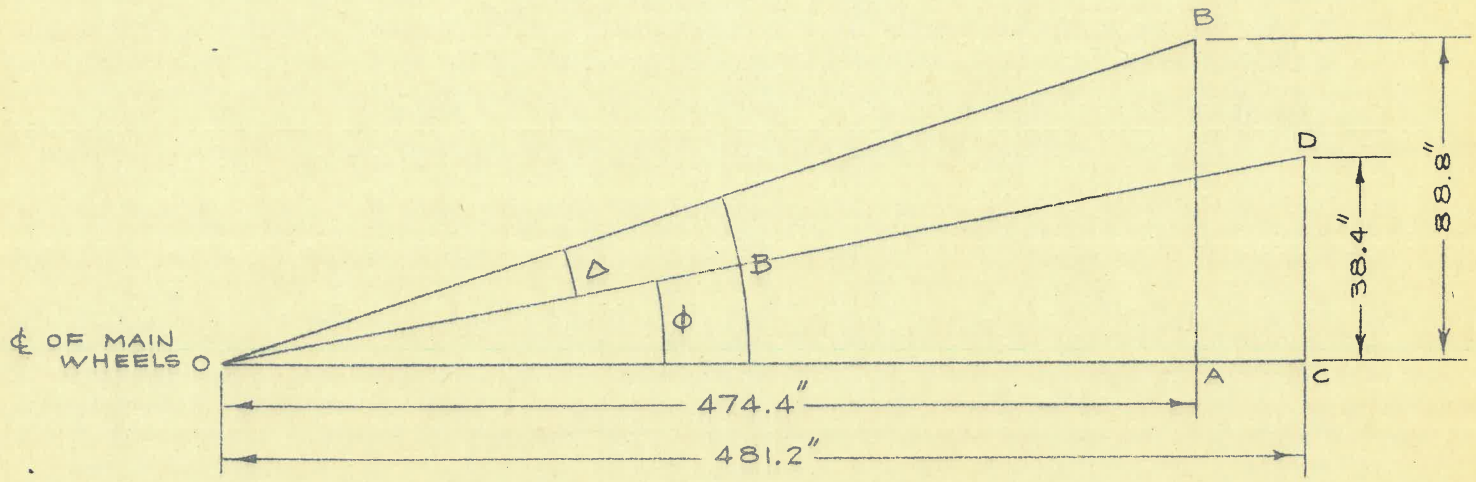
Horizontal C.G. = $\frac{245.6 - 204.4}{165.3}$ = 24.9% M.A.C.

WEIGHT EMPTY - VERTICAL C.G.

Angle of Deck Line with Horizontal -- Tail Down Weighing



$$\tan B = \frac{AB}{OA} = \frac{88.8}{474.4} = 0.1872; \qquad B = 10^{\circ}36'$$

$$\tan \phi = \frac{CD}{OC} = \frac{38.4}{481.2} = 0.0798; \qquad \phi = 4^{\circ}39'$$

$$\Delta = B - \phi = 10^{\circ}36' - 4^{\circ}39' = 5^{\circ}57'$$

Vertical C.G. Calculation - as Weighed - Tail Up (Deck Line Level)

Location	Weight	Arm (Forward of C.L. Axle)	Moment
Main	15,968.0	0	0
Nose	2,534.5	205.2	520,079
	18,502.5	28.1	520,079

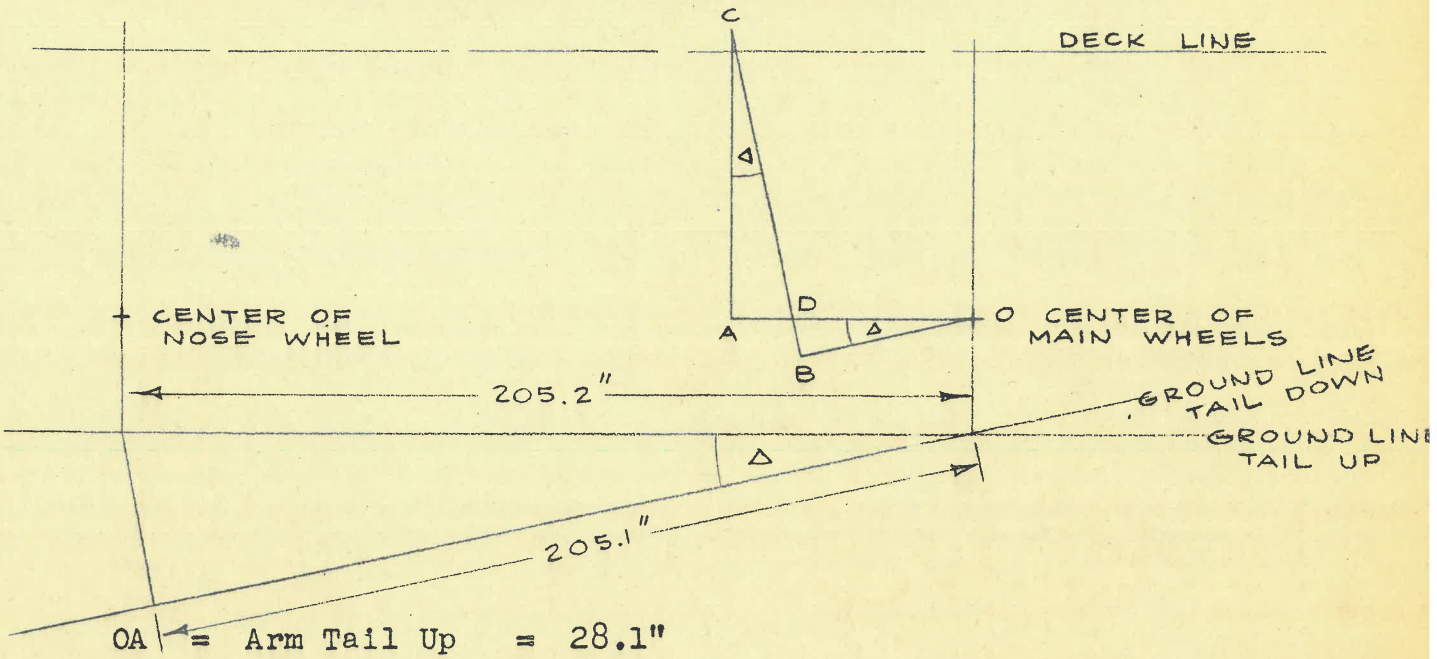
Tail Down

Main	16,983.5	0	0
Nose	1,519.0	205.1	311,547
	18,502.5	16.8	311,547

BY

CHECKED

Weight Empty - Vertical C.G. (Cont'd.)



OA = Arm Tail Up = 28.1"

OB = Arm Tail Down = 16.8"

$\Delta = 5^{\circ}57'$

$$OD = \frac{OB}{\cos 5^{\circ}57'} = \frac{16.8}{.9946} = 16.9"$$

AD = OA - OD = 28.1 - 16.9 = 11.2"

$$AC = \frac{AD}{\tan 5^{\circ}57'} = \frac{11.2}{.1042} = 107.5"$$ (above C.L. wheels)

Main Wheels above Base Line = 2.4"

∴ Vertical C.G., "as Weighed Condition", above Base Line

= 107.5" + 2.4" = 109.9" (W heels down)

BY

CHECKED

MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

ACTUAL WEIGHT EMPTY Vertical C.G.

	Weight	Vertical Arm	Vertical Moment
As Weighed	18502.5	109.9	2033425
Less: Special Load Items in Airplane During Weighing			
De-icer Shoes & Fairing			
Wing	- 75.0	146.0	- 10950
Tail	- 27.0	154.0	- 4158
Anti-Icer Fluid (2 gals.)	- 14.0	50.0	- 700
Purging System-Removable Part	- 27.0	138.0	- 3726
Dump Valve & Controls (2)	- 11.0	125.0	- 1375
	(-154.0)	(+135.8)	(- 20909)
Less: Useful Load Items in Airplane During Weighing			
Mark XXXV-5 Bomb Rack (4) & Mk XVII-1 Solenoids (4)	- 98.7	135.0	- 13325
Bomb Chocks (2 sets)	- 11.5	135.0	- 1553
Antenna & Insulators	- 6.9	105.0	- 725
Radio Direction Finder	- 15.8	100.0	- 1580
Interphone Installation (less microphones & Headsets)	- 34.1	50.0	- 1700
Residual Oil	- 83.0	150.0	- 12450
	[-250.0]	[125.3]	[-31333]
Plus: Weight Empty Items Not Installed in Airplane During Weighing			
Fuel Cells & Installation (10)	1309.0	149.0	195041
Mechanic's Knee Pad	0.5	35.0	18
Self-Sealing Fuel Lines	35.0	120.0	4200
Oxygen System-Additions	20.0	30.0	600
Torpedo Hoisting Slings addition	3.0	35.0	105
Revolving Circular Windshield Lock	1.5	95.0	143
Stewart-Warner Heating System	145.0	65.0	9425
Brake Cable Guard	1.5	45.0	68
Automatic Flight Control (G.F.M.Items)	(143.0)	(42.1)	(6025)
Rudder Motor	24.2	28.0	678
Elevator Motor	24.2	45.0	1089
Aileron Motor	24.2	45.0	1089
Banking Motor	8.0	45.0	360
A.F.C.Gyro	19.5	45.0	878
Bombsight Stabilizer	42.9	45.0	1931
Armor Plating & Attachment Parts-(Est.Wts.)	(663.0)	(77.8)	(51613)
Armor Plating at Tunnel Gun	117.8	55.0	6479
Armor Plating at Waist Gun Turret	111.9	92.0	10295
Armor Plating for Fuel Protection	107.4	128.7	13822
Armored vs Original Seats (2) Pilot's = 310.1# vs 38.1# = 272.0#	272.0	63.0	17136
Armor Plating at Bow Gun	53.9	72.0	3881
	(2321.5)	(115.1)	(267238)
Total Weight Empty	20420.0	110.1	2248421

Vertical C.G. = 110.1" - 100" = 10.1" above deck line

BY

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D A T A .

The following is a summary of the Actual Weighing Data Taken for the Weight Empty, Deck Line Level and Tail Down Weighings.

Weight Empty - Deck Line Level Position

Scale Location	Gross	Scale Calibration Correction	Tare	Net
Port Wheels	8152	- 23	- 13.5	8115.5
Starboard Wheels	7888	- 21	- 14.5	7852.5
Nose Wheel	3085.5		- 551.0	2534.5
		Net Total		18,502.5

Measurements

L.E.W. at Root forward to aft end of Nose Wheel Door	=	77.4"
Aft end of Nose W heel Door to C.L. of Nose Wheel	=	54.6"
L.E.W. at Root forward C.L. Main Wheels	=	73.2"
C.L. of Main Wheels above floor	=	24.1"
C.L. of Main Wheels above base line	=	2.4"
C.L. of Main Wheels to point at tail	=	474.4"
Point at tail above floor	=	112.9"

Dimensions

Horizontal reference line to C.L. of Main Wheels (199.95" + 73.2")	=	273.2"
C.L. of Nose Wheel forward L.E.W. at root (77.4" + 54.6")	=	132.0"
Horizontal reference line to C.L. of Nose Wheel (199.95" - 132.0")	=	68.0"
Point at tail above C.L. front Wheels (112.9" - 24.1")	=	88.8"
C.L. of Nose Wheel to C.L. of Main Wheel (132" + 73.2")	=	205.2"

Weight Empty - Tail Down

Scale Location	Gross	Scale Calibration Correction	Tare	Adjusted*
Port Wheels	8655	- 25	- 13.5	8616.5
Starboard Wheels	8402.5	- 21	- 14.5	8367.0
Nose Wheel	2231.5		- 712.5	1519.0
		Net Total		18,502.5

CHECKED

DATA (Cont'd.)

Measurements

L.E.W. at root forward to aft end of Nose Wheel Door	=	92.4"
Aft end of nose wheel door to C.L. of Nose Wheel	=	55.4"
L.E.W. at root forward C.L. Main Wheels	=	57.3"
C.L. of Main Wheels above floor	=	24.0"
C.L. of Main Wheels above base line	=	2.5"
C.L. of Main Wheels to point at Tail	=	481.2"
Point at Tail above Floor	=	62.4"

Dimensions

Horizontal reference line to C.L. of Main Wheels (199.95" + 57.3")	=	257.3"
C.L. of Nose Wheel forward L.E.W. at Root (92.4" + 55.4")	=	147.8"
Horizontal reference line to C.L. of Nose Wheel (199.95" - 147.8)	=	52.2"
Point at tail above C.L. front Wheels (62.4" - 24")	=	38.4"
C.L. of Nose Wheel to C.L. of Main Wheels (147.8" + 57.3")	=	205.1"

BY

CHECKED

Model PBY-5A
Report ZW-28-052
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ACTUAL WEIGHT AND HORIZONTAL BALANCE

Contract No. 7096 Airplane Gov't. No. 2456 Airplane Cont'r. No. 1

Date of weighing 10/10/41 Load Condition Weight Empty ~~XXXX~~ Sea. Article No.

	SCALE READING	TARE	SCALE CALI-BRATION	NET WEIGHT	GUARANTEED WEIGHT
Weight on wheels	16040	-28	-44	15968 $= W_W$	
Weight on Nose wheel	3085.5	-551		2534.5 $= W_T$	
TOTAL				18502.5 $= W_W + W_T$	
Airplane Weight (after corrections for missing items, etc; have been applied)				20420	20618.7

DIMENSIONS*	SYMBOL	CALCULATIONS*
L. E. ~~X~~. W. for'd ~~XXX~~ (—) C. L. axle 73.2 Ins.	e	$q = \frac{W_T \times m}{W_W + W_T} = \frac{2534.5 \times 205.2}{18502.5} = 28.1"$
C. L. axle to Nose ~~XXX~~ wheel 205.2 Ins.	m	
C. G. Fwd. Main ~~XXX~~ C. L. axle 28.1 Ins.	q	
C. G. ~~XXXXXX~~ aft L. E. ~~X~~. W. 45.1 Ins.	k	$k = e - q = 73.2 - 28.1 = 45.1"$
~~XXXXXXXXXXXXXXXXXXXX~~ H.R.L. Fwd. L.E.W. ~~XXX~~ ~~XXXXXXXXXXXXXXXXXXXX~~ 199.95 Ins.		
Length of m. a. c. 165.3 Ins.	**	
L. E. m. a. c. ~~XXXXX~~ aft (—) L. E. ~~X~~ W. 4.44 Ins.	**	
Allowable balance range ..... % m. a. c. to ..... % m. a. c.		
Airplane balance 24.9 % m. a. c.	***	See Page 25

*Refer to the Army Handbook, Section II, Parts I and II, for diagrams showing the various dimensions given above.

**m. a. c. calculated in accordance with the Handbook, Section II, Part II, (Army) or SR-7 (Navy).

***Balance after corrections for missing items, etc; have been applied.

NOTE: Guaranteed Weight shown above, is the guaranteed weight empty corrected for authorized changes and over or under weight of Government furnished material.

Approved by A. C. Rep. Jerome B. Klein

Witnessed by I. N. A.

Model PBY-5A
Report ZW-28052
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ACTUAL WEIGHT AND VERTICAL BALANCE

Contract No. 70496 Airplane Gov't. No. 2456 Airplane Cont'r. No. 1

Date of weighing 10/10/41 Load Condition Weight Empty Land, Sea. Article No.

	SCALE READING	TARE	SCALE CALI-BRATION	NET WEIGHT	GUARANTEED WEIGHT
Weight on wheels	17057.5	-28	-46	16983.5 $= W'_w$	
Weight on Nose wheel	2231.5	-712.5		1519.0 $= W'_T$	
TOTAL				18502.5 $= W'_w + W'_T$	
Airplane Weight (after corrections for missing items, etc; have been applied)				20420	20618.7

DIMENSIONS*	SYMBOL	CALCULATIONS*
C. L. axle to Nose wheel 205.1 Ins.	m'	
C. L. axle to ref. pt. "o" 481.2 Ins.	n'	$\beta = \tan^{-1}\frac{a-b}{n} = \tan^{-1}\left(\frac{112.9 - 24.1}{474.4}\right) = 10^\circ 36'$
Ref. pt. "o" above floor line 62.4 Ins.	a'	$\phi = \tan^{-1}\frac{a'-b'}{n'} = \tan^{-1}\left(\frac{62.4 - 24.0}{481.2}\right) = 4^\circ 39'$
C. L. axle above floor line 24.0 Ins.	b'	
C. L. axle to ref. pt. "o" 474.4 Ins.	n**	$\delta = \beta - \phi = 10^\circ 36' - 4^\circ 39' = 5^\circ 57'$
Ref. pt. "o" above floor line 112.9 Ins.	a**	$q' = \frac{W'_T \times m'}{W'w + W'_T} = \frac{1519 \times 205.1}{18502.5} = 16.8"$
C. L. axle above floor line 24.1 Ins.	b**	
Base line Below C. L. axle 2.4 Ins.	r**	$i = \frac{q'}{\cos\delta} - q = \frac{16.8"}{.9946} - 28.1 = -11.2"$
Tail down angle 5°.57' Degs.	δ	$f = r - p = r - \frac{i}{\tan\delta} = 2.4 - \left(\frac{-11.2}{.1042}\right) = 109.9"$
C. G. above Base line 109.9 Ins.	f	
Corrected C. G. above Base Line 110.1 Ins.	***	See Page 28

*Refer to the Army Handbook, Section II, Parts I and II, for diagrams showing the various dimensions given above.

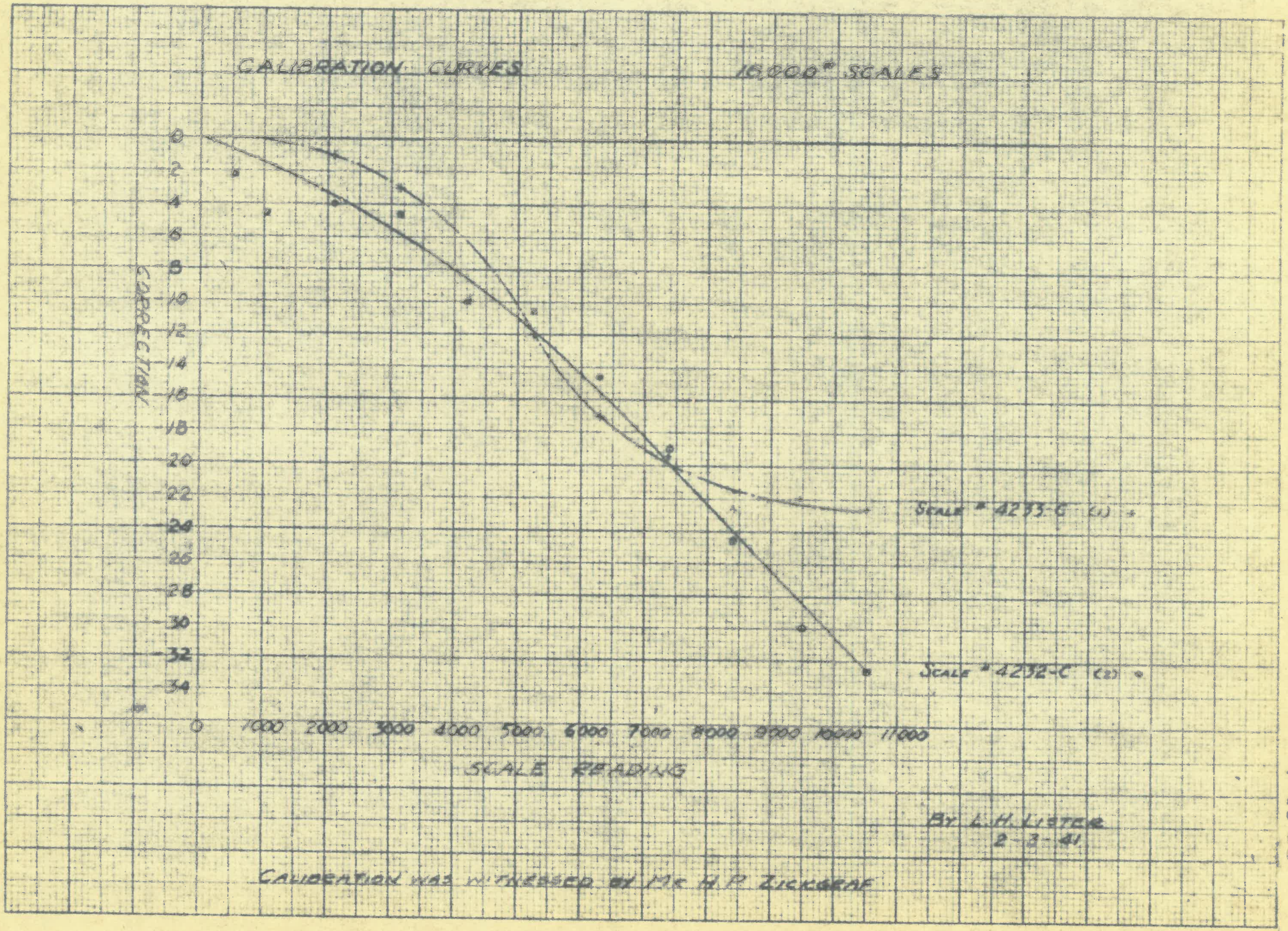
**These dimensions shall be obtained during the thrust line level weighing.

***C. G. location after corrections for missing items, etc., have been applied.

NOTE: Guaranteed Weight shown above, is the guaranteed weight empty corrected for authorized changes and over or under weight of Government furnished material.

Approved by A. C. Rep.

Witnessed by I. N. A. Jerome B. Klein



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WEIGHT EMPTY - DETAIL WEIGHT & BALANCE

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
*Wing	4543.3	264.6	1202018	145.8	662280
*Tail	516.4	689.1	355865	155.2	80124
Hull (incl.turrets & Armor Plating)	4260.9	283.2	1206885	67.9	289315
Floats & Retracting Mech.(Up)	460.1	267.0	122847	143.8	66162
Floats & Retracting Mech.(Down)	(460.1)	(267.0)	(122847)	(90.2)	(41501)
Main Landing Gear (Up)	1490.8	273.2	407286	44.0	65595
Nose Landing Gear (Up)	276.6	109.0	30149	26.0	7192
Main Landing Gear (Down)	(1490.8)	(273.2)	(407286)	(18.8)	(28027)
Nose Landing Gear (Down)	(276.6)	(68.0)	(18809)	(16.0)	(4426)
Retracting Mechanism	195.7	177.8	34796	44.0	8611
*Nacelles	496.8	187.0	92920	149.4	74238
Engines	2925.0	162.6	475605	152.5	446063
*Engine Accessories	282.5	182.0	51424	151.9	42920
*Power Plant Controls	110.0	198.3	21809	121.1	13321
*Propellers & Governors (Incl. provisions for anti-icer)	818.4	136.8	111924	152.0	124432
*Starting System	117.6	196.2	23077	153.0	17987
Lubricating System	22.4	197.5	4424	143.1	3205
Fuel System (Including self-sealing fuel cells)	1224.6	265.8	325499	147.0	180016
*Instruments	125.7	160.5	20181	103.1	12963
*Surface Controls	422.3	208.2	87918	75.7	31977
*Furnishings	1234.2	215.7	266228	60.2	74305
*Electrical Equipment	776.1	221.0	171529	103.9	80641
*Anchor & Handling Gear	120.6	115.7	13949	61.0	7356
Weight Empty (Floats & Landing Gear up)	20420.0	246.1	5026333	112.1	2288703
Weight Empty (Floats Up and Landing Gear Down)	20420.0	245.6	5014993	110.1	2248369
Weight Empty (Floats Down & Landing Gear Up)	20420.0	246.1	5026333	110.9	2264042

Floats & Landing Gear Up, Horizontal C.G. = $\frac{246.1 - 204.4}{165.3}$ = 25.2% M.A.C.

Floats & Landing Gear Up, Vertical C.G. = 112.1 - 100" = 12.1" above deck line

Floats Up & Landing Gear Down Horizontal C.G. = $\frac{245.6 - 204.4}{165.3}$ = 24.9% MAC

Floats Up-Landing Gear Down-Vertical C.G. = 110.1-100" = 10.1" above deck line

Floats Down Landing Gear up - Horizontal C.G. = $\frac{246.1 - 204.4}{165.3}$ = 25.2% MAC

Floats Down Landing Gear up Vertical C.G. = 110.9 - 100 = 10.9" above deck line

BY

*See Breakdown, pages 34-41

CHECKED

Weight Empty - Weight & Balance

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
Wing Group					
Center Panel (including dural plating, waterproof duck baffles and wooden backing platesfor fuel cells)	2627.0	263.6	692477	148.6	390372
Monocoque oil tank supports	85.3	230.0	19619	149.2	12727
Outer Panels	1471.5	263.5	387740	149.2	219548
Ailerons	134.1	329.0	44119	135.2	18130
Wing Struts	225.4	257.6	58063	95.4	21503
Total Wing Group	4543.3	264.6	1202018	145.8	662280
Tail Group					
Stabilizer & Integral Fin	299.1	676.0	202192	156.0	46660
Elevators	122.0	705.0	86010	154.0	18788
Rudder	95.3	710.0	67663	154.0	14676
Total Tail Group	516.4	689.1	355865	155.2	80124
Nacelles					
Engine Mounts	107.2	183.0	19618	151.0	16187
Monocoque Oil Tanks	169.2	208.0	35194	150.0	25380
Firewall	9.5	196.0	1862	150.0	1425
Nacelle Cowling & supports	37.8	192.2	7265	147.0	5557
Engine Ring Cowl & flaps	132.4	161.0	21316	150.0	19860
Blast Tube Magneto	4.8	168.0	806	160.0	768
Engine Mount attaching bolts	10.8	199.0	2149	150.0	1620
De-icing Provisions	6.2	189.7	1176	150.1	931
Oil Cooler Ducts, supports & Ducts	16.2	187.0	3029	130.0	2106
Paint	2.7	187.1	505	149.5	404
Total Nacelle Group	496.8	187.0	92920	149.4	74238
Engine Accessories					
Exhaust Collectors (2)	88.3	175.0	15453	156.0	13775
Air Intake System	82.5	185.0	15263	173.0	14273
Oil Temperature Cont.Valves(2)	9.5	198.0	1881	130.0	1235
Oil Coolers (2)	79.4	187.0	14848	130.0	10322
Vacuum Pump & Separator (2)	18.4	181.1	3332	145.0	2668
Fuel Pumps (2)	4.4	147.0	647	147.0	647
Total Engine Accessories	282.5	182.0	51424	151.9	42920
Power Plant Controls					
Spark,Throttle & Mixture	36.7	197.9	7263	121.0	4441
Preheater Controls	2.3	220.0	506	113.0	260
Ring Cowl Flaps	9.3	196.0	1823	140.0	1302
Pitch Adjusting Mech.	1.7	198.0	337	140.0	238
Propeller-Full Feathering Pump Motors, Cables, etc.	60.0	198.0	11880	118.0	7080
Total Power Plant Controls	110.0	198.3	21809	121.1	13321
Propellers & Governors (including Anti-Icer Provisions)					
Propellers-Hamilton(2)	793.0	135.1	107134	154.0	122122
Governors (2)	12.5	161.3	2016	128.0	1600
Anti-Icer Pump & Tank Install.	12.9	215.0	2774	55.0	710
Total Propellers & Governors	818.4	136.8	111924	152.0	124432

CHECKED

Weight Empty-Weight & Balance (continued)

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
Starting System					
Starters, cranks & extensions	105.3	197.3	20776	153.0	16111
Starter Controls	1.5	197.3	296	150.0	225
Primer System	3.6	162.3	584	152.5	549
Starter Supports, Universals, etc.	7.2	197.3	1421	153.0	1102
Total Starting System	117.6	196.2	23077	153.0	17987
Instruments					
On Pilot's Panel					
Rate of Climb Indicators (2)	1.7				
Turn & Bank Indicators (2)	2.6				
Airspeed Indicators (2)	1.4				
Manifold Pressure Gages (2)	1.9				
Tachometer Indicators (2)	4.6				
Directional Gyros (2)	7.3				
Compasses Mk. IX (2)	5.8				
Altimeters (2)	2.0				
Clock (1) (Elapsed time)	0.8				
Artificial Horizon (2)	8.6				
Elec.Tachometer Syn.Unit (1)	0.5				
Vacuum Gage 1	0.3				
De-Icer Pressure Gage (1)	0.3				
Total	37.8	75.0	2835	77.0	2911
On Bomber's Panel					
Airspeed Indicator (1)	0.6				
Altimeter (1)	1.1				
Inclinometer (1)	0.2				
Total	1.9	6.3	12	60.0	114
On Mechanic's Panel					
Manifold Pressure Gages (2)	1.9				
Altimeter (1)	1.1				
Clock (1) (Standard)	0.4				
Tachometer Indicators (2)	4.7				
Engine Gage Units (2)	3.5				
Oil Quantity Gages (2)	5.5				
Total	17.1	234.0	4001	108.0	1847
On Navigator's Panel					
Airspeed Indicator (1)	0.7				
Altimeter (1)	1.1				
Clock (1) (Elapsed time)	0.9				
Total	2.7	177.0	478	62.0	167
Miscellaneous Instruments					
Single Point Thermocouple Units (2)	6.3	200.0	1260	130.0	819
Tachometer Generators (2)	4.3	187.0	804	160.0	688
Fuel Flowmeters (2)	9.0	232.0	2088	123.0	1107
Fuel Quantity Gages & Shut off Valve	7.6	244.0	1854	130.0	988
Bomber's Air Thermometer (1)	1.1	0	0	56.0	616
Mechanic's Air Therm.(1)	1.0	241.0	241	108.0	108

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MODEL PBY-5A AIRPLANE REPORT NO ZW-28-052

Weight Empty-Weight & Balance (continued)

		Horizontal		Vertical	
Instruments (continued)	Weight	Arm	Moment	Arm	Moment
Miscellaneous Instruments (contd.)					
Pilot's air thermometer (1)	1.0	90.0	90	88.0	88
Suction Regulating Valves (2)	1.5	65.0	98	52.0	78
Mechanic's Inclonometer (1)	0.2	242.0	48	102.0	20
Pitot Static Tube & Supt.(1)	2.7	210.0	567	148.0	400
Radio Transmission Lines & couplings for ZA Inst.Landing equipment	5.5	170.0	935	50.0	275
Tubing for:Manifold Pres.Gages	3.6	175.0	630	105.0	378
Airspeed Indicator	7.7	200.0	1540	120.0	924
Altimeter & Turn Ind.	1.0	150.0	150	62.0	62
Engine Gage Unit	3.0	204.0	612	127.0	381
Artificial Horizon & Direction gyro	0.7	65.0	46	48.0	34
De-Icer Press.Gage	0.8	65.1	52	48.0	38
Clips,Bolts, Nuts, etc.	9.2	200.0	1840	100.0	920
Total	66.2	194.2	12855	119.7	7924
Total Instruments	125.7	160.5	20181	103.1	12963
Surface Controls					
Control column assembly	27.0	87.0	2349	69.0	1863
Rudder Pedal	27.0	75.0	2025	44.0	1188
Rudder Tab Control	14.3	505.0	7222	129.0	1845
Elevator Tab Controls	13.6	510.0	6936	129.0	1754
Aileron Tab Controls	14.2	270.0	3834	130.0	1846
Elevator Controls	41.6	434.0	18054	86.0	3578
Aileron Controls	61.4	276.0	16946	133.0	8166
Rudder Controls	53.0	392.0	20776	84.0	4452
Automatic Pilot Installation					
Supports-aileron,elevator banking motors & gyros	4.3	77.0	331	40.0	172
Supports-Rudder Motor	1.6	53.0	85	26.0	42
Brackets-Elevator,Ail.& Rud.	4.7	75.0	353	35.0	235
Pulleys & Cables	3.9	75.0	293	35.0	137
Electrical Equipment	11.0	75.0	825	50.0	550
Miscellaneous	0.7	75.0	53	45.0	32
Rudder Motor	24.2	53.0	1283	28.0	678
Elevator Motor	24.2	67.0	1621	45.0	1089
Aileron Motor	24.2	85.0	2057	45.0	1089
Banking Motor	8.0	69.0	552	45.0	360
A.F.C. Gyro	19.5	77.0	1502	45.0	878
Angle of Attack Adj.Unit	1.0	177.0	177	92.0	92
Bombsight Stabilizer	42.9	15.0	644	45.0	1931
Total Surface Controls	422.3	208.2	87918	75.7	31977
Furnishings					
Seats					
Pilot's Armor Plates Seats, incl.supports	310.1	113.0	35041	63.0	19536
Bombers	5.2	40.0	208	36.0	187
Mechanic's	10.0	260.0	2600	87.0	870

BY

CHECKED

Weight Empty - Weight & Balance (continued)

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
Furnishings (continued)					
Seats (continued)					
Radio Operator's	12.6	199.0	2507	40.0	504
Navigator's	9.5	180.0	1710	40.0	380
Observer's at Blister (2)	7.7	390.0	3003	45.0	347
Seat Cushions	34.1	152.0	5183	61.0	2080
Safety Belts					
Pilot's Type (5)	14.4	172.0	2477	65.0	936
Gunner's Type (4)	11.3	318.0	3593	60.0	678
Bunk Belts (4)	4.9	339.0	1661	40.0	196
Tunnel Gunner's Safety Cable	1.5	524.0	786	80.0	120
Instrument Boards					
Pilot's	7.7	75.0	578	78.0	601
Mechanic's	5.0	233.0	1165	110.0	550
Navigator's	0.5	168.0	84	50.0	25
Bomber's	0.9	10.0	9	60.0	54
Radio Operator's	1.4	193.0	270	80.0	112
Lockers					
Tool & Misc.Gear (1)	12.3	283.0	3481	30.0	369
Food					
At Sta. 2.5	10.5	145.0	1523	42.0	441
At Sta. 4.25	9.8	250.0	2450	86.0	843
Parachute Stowage (7)	2.8	164.0	459	61.0	171
Toilet(1) Bag Stowage & Relief Tube	8.6	456.0	3922	38.0	327
Bilge Pump & Hose & Stowage	32.4	274.0	8878	36.0	1166
Bunks-Sta. 5-6 (4)	44.3	344.0	15239	40.0	1772
Entrance Ladder & Stowage (1)	7.8	447.0	3487	36.0	281
Mechanic's crash pads	0.8	260.0	208	122.0	98
Miscellaneous Chart Stowage	1.9	100.0	190	50.0	95
Sea Anchor Stowage	1.4	420.0	588	30.0	42
Propane Stove Stowage	1.5	283.0	425	28.0	42
Auxiliary Power Unit Support	7.3	255.0	1862	28.0	204
Propeller Hoist Fittings	0.5	183.0	92	150.0	75
Work Platforms & Stowage (2)	33.6	343.0	11525	25.0	840
Miscellaneous Stowages	12.9	245.0	3161	60.0	774
Curtains (Pilot's & Nav.)	4.2	120.0	504	97.0	407
Draft Screen	3.9	59.0	230	50.0	195
Mechanic's Knee Pads	0.5	245.0	123	35.0	18
Stove & Percolator	10.3	265.0	2730	83.0	855
Fire Extinguishers					
Engine (1)	31.6	215.0	6794	105.0	3318
Portable (1)	16.6	225.0	3735	60.0	996
Hand (3)	19.9	244.0	4856	30.0	597
Radio Provisions					
Table & Lockers	17.7	209.0	3699	49.0	867
Coil Box Brackets	2.8	217.0	608	62.0	174
Antenna Masts	1.1	215.0	237	160.0	176
Standpipe & Plug	3.3	183.0	604	30.0	99
Standpipe Plug Stowage	0.2	171.0	34	24.0	5

Weight Empty - Weight & Balance (continued)

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
Furnishings (continued)					
Radio Provisions (cont'd)					
Provision for Interphone	2.1	190.0	399	71.0	149
Miscellaneous	0.9	210.0	189	50.0	45
Water Containers					
Just aft Sta. #2 (2)	8.5	126.0	1071	60.0	510
Aft Sta. #4 (2)	8.5	238.0	2023	75.0	638
Navigating Provisions					
Table & Drawer	31.4	172.0	5401	49.0	1539
Octant & Binocular Stowage	4.0	197.0	788	70.0	280
Watch Stowage	0.9	196.0	176	50.0	45
Map Case & Report Holders	0.9	100.0	90	50.0	45
Book & Paper Stowage	4.9	218.0	1068	68.0	333
Portable Compass Provisions	1.0	123.0	123	76.0	76
Pelorus Drift Sight Mounts	1.4	238.0	333	75.0	105
Mk. VII Drift Sight Prov.	3.2	564.0	1805	45.0	144
Protractor Stowage	0.3	140.0	42	49.0	15
Flexible Gun Provisions					
Gun Mounts-Bow	10.0	24.0	240	77.0	770
-Rear	19.0	426.8	8109	45.0	855
-Tunnel	9.7	538.0	5219	57.0	553
Bow Gun Ammunition Racks	6.3	30.0	189	55.0	347
Rear Gun Ammunition Racks	13.6	393.0	5345	53.0	721
Tunnel Gun Ammunition Racks	2.2	534.0	1175	65.0	143
Bow Gun Stowages	0.8	50.0	40	46.0	37
Tunnel Gun Stowages	1.0	551.0	551	59.0	59
Bomb & Torpedo Installation					
Release Equipment	43.3	182.0	7881	96.0	4157
Bombsight Cover	5.4	15.0	81	45.0	243
Bomb Hoist Equipment	0.3	254.0	76	155.0	47
Torpedo Director Supports	1.4	79.0	111	88.0	123
Torpedo Slings	12.8	251.0	3213	124.0	1587
Pyrotechnics Provisions					
Very's Pistol Holder	0.4	241.0	96	64.0	26
Very's Ammunition Holder	2.3	249.0	573	66.0	152
Flare Holders & Release Mech.	28.9	463.0	13381	63.0	1821
Smoke Candle Handle	0.4	386.0	154	70.0	28
Smoke Candle Handle Stowage	0.2	386.0	77	70.0	14
Smoke Candle Container	0.3	386.0	116	52.0	16
Float Light Rack	3.1	490.0	1519	72.0	223
Mk.V Mod.I Smoke Tank Prov.	9.8	229.0	2244	130.0	1274
Flare Stowage Rack	9.5	200.0	1900	32.0	304
Potassium Chromatic Containers	2.5	284.0	710	20.0	50
F.C. Cover	6.6	58.0	383	45.0	297
Mk. VII Target Reel Prov.	3.3	545.0	1799	57.0	188
Attitude Control Device	6.6	138.0	911	55.0	363
Prov. for oxygen equip.t	65.0	227.0	14755	30.0	1950
Windshield Washer-Pilot's	5.3	65.0	345	70.0	371

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MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

Weight Empty - Weight & Balance (continued)

		Horizontal		Vertical	
	Weight	Arm	Moment	Arm	Moment
Furnishings (continued)					
Control Yoke Boots	0.6	87.0	52	30.0	18
De-Icer Distr.Valve	11.5	210.0	2415	135.0	1553
Boot Air Separator	1.8	210.0	378	135.0	243
Stewart-Warner Heating Sys.	145.0	249.4	36163	65.0	9425
Total Furnishings	1234.2	215.7	266228	60.2	74305
Electrical Equipment					
Generator Installation					
Generators-Type NEA-2D(2)	82.1	191.0	15681	150.0	12315
Generator Control Boxes (2)	12.6	235.0	2961	119.0	1499
Generator Cut-outs (2)	5.1	225.0	1148	75.0	383
Generator Supports	6.8	191.0	1299	150.0	1020
Auxiliary Power Unit & Float Chamber (incl.Muffler)	128.0	255.0	32640	56.0	7168
Batteries					
Type S-34 (2)	77.8	210.0	16338	147.0	11437
Type S-17(2)	49.0	200.0	9800	16.0	784
Retaining Bolts & Supports	2.7	207.0	559	103.0	278
Selector Switch-Type B-1	1.0	225.0	225	75.0	75
Ammeters and Voltmeters	2.2	225.0	495	75.0	165
Lights					
Running	1.2	375.0	450	155.0	186
Formation	3.3	240.0	792	145.0	479
Landing	13.7	209.0	2863	142.0	1945
Instrument	0.5	155.0	78	93.0	47
Interior-Fixed	5.3	255.0	1352	95.0	513
Anchor Light	1.3	75.0	98	70.0	91
Wiring & Cables	162.8	227.3	37004	112.0	18234
Conduit & Fittings	108.5	222.0	24087	112.0	12152
Switches	11.0	123.0	1353	68.0	748
Rheostats	1.4	176.0	246	84.0	118
Hoist Motor Switch	11.9	227.0	2701	78.0	928
Power Terminal Boxes	12.6	221.0	2785	152.0	1915
Junction Boxes	34.8	222.0	7726	112.0	3897
Provisions for De-Icing	6.4	227.9	1459	105.0	672
Torpedo Release Install.	3.1	230.0	713	140.0	434
Distribution Panels	8.9	225.0	2003	75.0	668
Pilot's Signal Box & Supts.	3.4	90.0	306	90.0	306
Plugs at Firewall	6.5	199.0	1294	146.0	949
Formation Bomb Release Signal	3.8	225.0	855	65.0	247
Ignition Switch & Panel	1.0	87.0	87	70.0	70
Tape, Terminals & Miscell.	7.4	288.0	2131	124.0	918
Total Electrical	776.1	221.0	171529	103.9	80641

BY

CHECKED

Weight Empty - Weight & Balance (continued)

	Weight	Horizontal		Vertical	
		Arm	Moment	Arm	Moment
Anchor & Handling Gear					
Anchor	31.8	49.0	1558	63.0	2003
Anchor Line	16.0	40.0	640	56.0	896
Pendant	4.6	25.0	115	48.0	221
Clamp Assembly	5.1	50.0	255	47.0	240
Lizard	1.2	50.0	60	83.0	100
Winch & Anchor Housing	33.4	50.0	1670	63.0	2104
Hoisting Sling	24.5	302.0	7399	63.0	1544
Mooring Quick Release Device	4.0	563.0	2252	62.0	248
Total Anchor & Handling Gear	120.6	115.7	13949	61.0	7356

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USEFUL LOAD - WEIGHT & BALANCE

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
785 Gal. Patrol-Crew Functional					
Crew & Life Jackets (7)					
Pilot	180.0	108.0	19440	65.5	11790
Assistant Pilot	180.0	108.0	19440	65.5	11790
Navigator	180.0	187.0	33660	54.0	9720
Radio Operator	180.0	199.0	35820	54.0	9720
Mechanic	180.0	255.0	45900	87.0	15660
Bunk Sta. #5-#6 (2)	360.0	344.0	123840	30.0	10800
Total Crew & Life Jackets	(1260.0)	(220.7)	(278100)	(55.1)	(69480)
Parachutes (7)					
Aft Bulkhead #2 (2)	40.0	136.0	5440	63.0	2520
On Bulkhead #4 (1)	20.0	231.0	4620	67.5	1350
On Bulkhead #5 (2)	40.0	302.0	12080	70.0	2800
On Bulkhead #2 (2)	40.0	123.0	4920	54.5	2180
Total Parachutes	(140.0)	(193.3)	(27060)	(63.2)	(8850)
Fuel-800 Gals. @6.0#(incl.15 gals. aux.power unit fuel)	(4800.0)	(269.3)	(1292640)	(141.7)	(680160)
Oil -50 gals. @ 7.5#	(375.0)	(208.0)	(78000)	(141.0)	(52875)
Armament					
Flexible Guns					
Bow Gun Installation					
30 cal. M-2 gun(1)	20.0	23.5	470	80.0	1600
Mk. VI Ring sight (1)	1.0	14.5	15	80.0	80
D-4 Wing Vane Sight (1)	0.6	1.0	1	80.0	48
Mk.III Ejected Link Cont.(1)	1.1	23.5	26	80.0	88
Mk.III Ejected Case Cont.(1)	1.6	23.5	38	80.0	128
Gun Mt.Adapter Mk.III(1)	3.4	24.0	82	77.0	262
Ammunition 1000 Rds.	80.0	26.8	2144	68.0	5440
Total Bow Gun Installation	107.7	25.8	2776	71.0	7646
Waist Gun Installation					
.50 cal. M-2 Guns (2)	145.8	422.8	61644	88.0	12831
Mk.VII Ring Sights (2)	2.4	427.8	1027	84.0	202
Mk.IV Posts Sights (2)	0.6	438.8	263	76.0	46
Mk.II Ejected Case Cont.(2)	9.2	419.8	3862	86.1	792
Mk.II Ejected Link Cont.(2)	3.6	436.6	1572	80.3	289
Mk.V Gun Mount Adapters (2)	42.0	426.8	17927	85.0	3570
Ammunition 800 Rds.	377.6	393.0	148397	53.0	20013
Total Waist Gun Installation	581.2	403.8	234692	64.9	37743
Tunnel Gun Installation					
.30 cal. M-2 Gun (1)	20.0	551.0	11020	59.0	1180
Mk. VIII Ring Sight (1)	0.4	556.0	222	59.0	24
Mk. V Post Sight (1)	0.4	572.0	229.	59.0	24
Mk.III Ejected Link Cont.(1)	1.1	551.0	606	59.0	65
Mk. III Ejected Case Cont(1)	1.6	551.0	882	59.0	94
Mk.III Gun Mt.Adapter (1)	3.4	551.0	1873	56.0	190
Ammunition 500 Rds.	40.0	537.0	21480	63.7	2548
Total Tunnel Gun Install.	66.9	542.8	36312	61.7	4125
Total Flexible Guns	[755.8]	[362.2]	[273780]	[65.5]	[49514]

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MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

USEFUL LOAD - WEIGHT & BALANCE

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
Armament (continued)					
Pyrotechnics					
Very's Pistol Installation					
Very's Pistol-Pilot's (1)	2.5	95.5	239	70.0	175
Very's Pistol-Rear Entr.(1)	2.5	387.0	968	58.0	145
Ammunition-Pilots-24 Rds.	2.9	109.0	316	70.0	203
Ammunition-Rear Entr-24 Rds.	2.9	389.0	1128	61.0	177
Total	10.8	245.5	2651	64.8	700
Flare Installation					
Flares near containers (2)	39.0	511.0	19929	73.0	2847
Flares in Rack (6)	117.0	155.0	18135	29.0	3393
Total	156.0	244.0	38064	40.0	6240
Float Lights (18)	45.0	490.0	22050	72.0	3240
Smoke Grenades (2)	3.6	386.0	1390	52.0	187
Total Pyrotechnics	[215.4]	[297.8]	[64155]	[48.1]	[10367]
Total Armament	(971.2)	(348.0)	(337935)	(61.7)	(59881)
Equipment					
Radio					
Main Unit	235.0	180.0	42300	51.0	11985
Intersquadron Unit	63.0	128.0	8064	58.0	3654
Interphone Unit	21.4	190.0	4066	68.0	1455
Direction Finding Loop	16.7	210.0	3507	100.0	1670
Antenna Insulators, etc.	12.0	270.6	3247	83.6	1003
Total Radio	[348.1]	[175.8]	[61184]	[56.8]	[19767]
Navigating					
Pelorus Sight (2) bases (4)	5.0	208.0	1040	60.0	300
Binoculars	2.6	124.0	322	74.0	192
Misc.Charts, etc.	5.0	154.0	770	53.0	265
Chart Board Mk. II	2.8	109.0	305	46.0	129
Protractor Mk.III	5.1	200.0	1020	53.0	270
Books	2.0	218.0	436	74.0	148
Drift Sight, Mk. VII	18.0	187.0	3366	60.0	1080
Octants & Covers (2)	13.0	197.0	2561	53.0	689
Navigating Watches (2)	3.3	196.0	647	53.0	175
Total Navigating	[56.8]	[184.3]	[10467]	[57.2]	[3248]
Miscellaneous					
Tool Kit	10.0	283.0	2830	30.0	300
First Aid Kit	2.6	384.0	998	74.0	192
Food	140.0	196.0	27440	42.0	5880
Water	140.0	180.0	25200	59.0	8260
Flashlights & Batteries(6)	7.8	283.0	2207	30.0	234
Canvas Bucket	2.0	270.0	540	30.0	60
Life Raft Mk. VII	64.0	467.0	29888	77.0	4928
Rope-300 ft.	23.0	270.0	6210	30.0	690
Buoy Hook & Rope	6.0	62.0	372	31.0	186
Engine Tool Kit	12.0	283.0	3396	30.0	360
Boat Hook	4.0	305.0	1220	45.0	180
Spotlight, case & Base	9.0	69.0	621	34.0	306
Aux.Pwr.Unit Oil-2 gal.	15.0	255.0	3825	56.0	840

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MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

USEFUL LOAD - WEIGHT & BALANCE

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
Equipment (continued)					
Miscellaneous (continued)					
Aux.Pwr.Unit Fuel(incl.in main fuel)					
Bedding, etc. (7 men)	35.0	265.0	9275	42.0	1470
Personal effects (7 men)	70.0	265.0	18550	42.0	2940
Oxygen Equipment	327.0	242.4	79265	50.0	16350
Total Miscellaneous	[867.4]	[244.2]	[211837]	[49.8]	[43176]
Total Equipment	(1272.3)	(222.8)	(283488)	(52.0)	(66191)
Total Useful Load	8818.5	260.5	2297223	106.3	937437
1191 Gal. Patrol-Crew Functional-Full Fuel with Fuel Cells					
Crew & Life Jackets (7)	1260.0	220.7	278100	55.1	69480
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel 1206 Gals. @ 6#(full fuel with fuel cells)	7236.0	266.6	1929118	145.3	1051391
Oil 75 gals. @ 7.5#	562.5	208.0	117000	144.0	81000
Armament	971.2	348.0	337935	61.7	59881
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	11442.0	259.7	2972702	116.8	1336793
500 Gal. Bomber (2) 1000# Bombs-Crew Functional					
Crew & Life Jackets (7)	1260.0	220.7	278100	55.1	69480
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel-515 Gals. @ 6.0#(incl. 15 gals. Aux.Pwr.Unit fuel)	3090.0	270.7	836463	138.3	427347
Oil 35 Gals. @ 7.5#	262.5	208.0	54600	140.0	36750
Armament					
Flexible Guns	(755.8)	(362.2)	(273780)	(65.5)	(49514)
Pyrotechnics	(215.4)	(297.8)	(64155)	) 48.1)	(10367)
Bombing Installation					
1000# Bombs (2)	2000.0	249.0	498000	122.0	244000
Bomb Racks Mk. XXXV (4) & Solenoids Mk. XVII-1(4)	92.0	250.0	23000	135.0	12420
Bombsight-Mk. XV-4 (1)	35.0	15.0	525	45.0	1575
Pilot Director Indicators(2)	1.2	72.0	86	65.0	78
Firing Key NA-41A (1)	1.3	17.0	22	67.0	87
Sets Bomb Chocks (2)	10.4	250.0	2600	135.0	1404
Total Bombing Installation	(2139.9)	(245.0)	(524233)	(121.3)	(259564)
Total Armament	3111.1	277.1	862168	102.7	319445
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	9135.9	256.3	2341879	101.6	928063

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MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

USEFUL LOAD - WEIGHT & BALANCE

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
500 Gal. Bomber (4) 1000# Bombs-Crew Functional					
Crew & Life Jackets (7)	1260.0	220.7	278100	55.1	69480
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel 515 Gals. @ 6# (incl.15 Gal. Aux.Pwr.Unit fuel)	3090.0	270.7	836463	138.3	427347
Oil 35 Gals. @ 7.5#	262.5	208.0	54600	140.0	36750
Armament					
Flexible Guns	(755.8)	(362.2)	(273780)	(65.5)	(49514)
Pyrotechnics	(215.4)	(297.8)	(64155)	(48.1)	(10367)
Bombing Installation					
1000# Bombs (4)	4000.0	249.0	996000	122.0	488000
Bomb Racks Mk. XXXV(4) & Solenoids Mk.XvII-1(4)	92.0	250.0	23000	135.0	12420
Bombsight-Mk. XV-4 (1)	35.0	15.0	525	45.0	1575
Pilot Director Ind. (2)	1.2	72.0	86	65.0	78
Firing Key NA-41A (1)	1.3	17.0	22	67.0	87
Sets Bomb Chocks (2)	10.4	250.0	2600	135.0	1404
Total Bombing Install.	(4139.9)	(246.9	X1022233)	(121.6)	(503564)
Total Armament	5111.1	266.1	1360168	110.2	563445
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	11135.9	255.0	2839879	105.3	1172063
500 Gal. Bomber (12) 100# Class (116#) Bombs-Crew Functional					
Crew & Life Jackets (7)	1260.0	220.7	278100	55.1	69480
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel 515 Gals. @ 6# (incl.15 gals. Aux.Pwr.Unit Fuel)	3090.0	270.7	836463	138.3	427347
Oil 35 Gals. @ 7.5#	262.5	208.0	54600	140.0	36750
Armament					
Flexible Guns	(755.8)	(362.2)	(273780)	(65.5)	(49514)
Pyrotechnics	(215.4)	(297.8)	(64155)	(48.1)	(10367)
Bombing Installation					
Bombs (12)	1392.0	263.0	366096	121.0	168432
Bomb Racks Mk. XLII (4)	208.0	264.0	54912	129.0	26832
Bombsight Mk. XV-4 (1)	35.0	15.0	525	45.0	1575
Firing Key NA-41A (1)	1.3	17.0	22	67.0	87
Pilot Director Ind. (2)	1.2	72.0	86	65.0	78
Bomb Rack Supts-External	24.0	263.0	6312	129.0	3096
Total Bombing Install.	(1661.5)	(257.6)	(427953)	(120.4)	(200100)
Total Armament	2632.7	290.9	765888	98.8	259981
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	8657.5	259.4	2245599	100.3	868599

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MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

USEFUL LOAD - WEIGHT & BALANCE

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
1000 Gal. Bomber (2) 1000# Bombs-Crew Functional					
Crew & Life Jackets (7)	1260.0	220.7	278100	55.1	69480
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel 1015 Gals. @ 6# (incl. 15 gals. Aux.Pwr.Unit Fuel)	6090.0	268.8	1636992	143.9	876351
Oil 60 Gals. @ 7.5#	450.0	208.0	93600	143.0	64350
Armament	3111.1	277.1	862168	102.7	319455
Equipment	1272.3	222.8	283488	52.0	66191
Total	12323.4	258.2	3181408	114.0	1404677
500 Gal. Torpedo (2) Mk. XIII Torpedoes-Crew Functional					
Crew & Life Jackets (7)	1260.0	220.7	278100	55.1	69480
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel 515 Gals. @ 6.0# (incl. 15 Gals.Aux.Pwr.Unit Fuel)	3090.0	270.7	836463	138.3	427347
Oil 35 Gals. @ 7.5#	262.5	208.0	54600	140.0	36750
Armament					
Flexible Guns	(755.8)	(362.2)	(273780)	(65.5)	(49514)
Pyrotechnics	(215.4)	(297.8)	(64155)	(48.1)	(10367)
Torpedo Installation					
Torpedoes Mk. XIII (2)	3870.0	247.0	955890	124.0	479880
Starting Mech. (2)	1.9	309.0	587	134.0	255
Torpedo Propeller Stops (2)	0.1	318.0	32	135.0	14
Torpedo Director Mk. XXVIII(1)	3.0	85.0	255	103.0	309
Firing Key NA-41A(1)	1.3	122.0	159	78.0	101
Sets Torpedo Chocks & Supts (2)	317.8	249.0	79132	134.0	42585
Total Torpedo Installation	(4194.1)	(247.0	(1036055)	(124.7)	(523144)
Total Armament	5165.3	266.0	1373990	112.9	583025
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	11190.1	255.0	2853701	106.5	1191643
785 Gal. Patrol-Crew Battle					
Crew & Life Jackets (7)					
Bomber	180.0	24.0	4320	47.5	8550
Pilot	180.0	108.0	19444	65.5	11790
Radio Operator	180.0	199.0	35820	54.0	9720
Mechanics	180.0	255.0	45900	87.0	15660
Waist Gunners (2)	360.0	427.0	153720	70.0	25200
Tunnel Gunner	180.0	523.0	94140	65.0	11700
Total Crew & Life Jackets	1260.0	280.4	353344	65.6	82620
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel-800 Gals. @ 6#(Incl.15 gals.Aux.Pwr.Unit Fuel)	4800.0	269.3	1292640	141.7	680160
Oil 50 Gals. @ 7.5#	375.0	208.0	78000	141.0	52875
Armament	971.2	348.0	337935	61.7	59881
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	8818.5	269.3	2374561	107.8	950577

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MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

USEFUL LOAD - WEIGHT & BALANCE

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
1191 Gal.Patrol-Crew Battle-Full Fuel with Fuel Cells					
Crew & Life Jackets (7)	1260.0	280.4	353344	65.6	82620
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel 1206 Gals. @ 6# (full fuel with fuel cells)	7236.0	266.6	1929118	145.3	1051391
Oil 75 Gals. @ 7.5#	562.5	208.0	117000	144.0	81000
Armament	971.2	348.0	337935	61.7	59881
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	11442.0	266.6	3050039	118.0	1349933
500 Gal. Bomber (2) 1000# Bombs-Crew Battle					
Crew & Life Jackets (7)	1260.0	280.4	353344	65.6	82620
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel -515 Gals. @ 6#(incl.15 gals.Aux.Pwr.Unit fuel)	3090.0	270.7	836463	138.3	427347
Oil 35 Gals. @ 7.5#	262.5	208.0	54600	140.0	36750
Armament	3111.1	277.1	862168	102.7	319445
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	9135.9	264.8	2419217	103.0	941203
500 Gal. Bomber (4) 1000# Bombs Crew Battle					
Crew & Life Jackets (7)	1260.0	280.4	353344	65.6	82620
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel 515 Gals. @ 6# (incl.15 gals.Aux.Pwr.Unit Fuel)	3090.0	270.7	836463	138.3	427347
Oil 35 Gals. @ 7.5#	262.5	208.0	54600	140.0	36750
Armament	5111.1	266.1	1360168	110.2	563445
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	11135.9	262.0	2917217	106.4	1185203
500 Gal. Bomber (12) 100# Class (116#) Bombs-Crew Battle					
Crew & Life Jackets (7)	1260.0	280.4	353344	65.6	82620
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel 515 Gals. @ 6# (incl.15 gals. Aux.Pwr.Unit Fuel)	3090.0	270.7	836463	138.3	427347
Oil 35 Gals. @ 7.5#	262.5	208.0	54600	140.0	36750
Armament	2632.7	291.3	765888	98.8	259981
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	8657.5	268.3	2322937	101.8	881739
1000 Gal. Bomber (2) 1000# Bombs-Crew Battle					
Crew & Life Jackets (7)	1260	280.4	353344	65.6	82620
Parachutes (7)	140.	193.3	27060	63.2	8850
Fuel 1015 gals. @ 6#(including 15 gals.aux.pwr.unit fuel)	6090.	268.8	1636992	143.9	876351
Oil 60 gals. @ 7.5#	450.	208.	93600	143.	64350
Armament	3111.1	277.1	862168	102.7	319455
Equipment	1272.3	222.8	283488	52.	66191
Total Useful Load	12323.4	264.4	3258748	115.1	1417817

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USEFUL LOAD - WEIGHT & BALANCE (Cont'd.)

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
500 Gal. Torpedo (2) Mk XIII Torpedoes - Crew Battle					
Crew & Life Jackets (7)	1260.0	280.4	353344	65.6	82620
Parachutes (7)	140.0	193.3	27060	63.2	8850
Fuel (515 gals.@ 6# (Incl.15 gals.Aux.Pwr.Unit Fuel)	3090.	270.7	836463	138.3	427347
Oil 35 gals. @ 7.5#	262.5	208.0	54600	140.0	36750
Armament	5165.3	266.0	1373990	112.9	583025
Equipment	1272.3	222.8	283488	52.0	66191
Total Useful Load	11190.1	261.9	2931039	107.7	1204783

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GROSS WEIGHTS

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
785 Gal. Patrol - Crew Functional					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	8818.5	260.5	2297223	106.3	937437
Gross Weight	29238.5	250.1	7312046	109.0	3185858

Horizontal C.G. = $\frac{250.1 - 204.4}{165.3}$ = 27.6% M.A.C.

Vertical C.G. = 109 - 100 = 9" above deck line

1191 Gal. Patrol-Crew Functional-Full Fuel with Fuel Cells					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	11442.0	259.7	2972702	116.8	1336793
Gross Weight	31862.0	250.7	7987525	112.5	3585214

Horizontal C.G. = $\frac{250.7 - 204.4}{165.3}$ = 28% M.A.C.

Vertical C.G. = 112.5 - 100 = 12.5" Above Deck Line

500 Gal. Bomber (2) 1000# Bombs - Crew Functional					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	9135.9	256.3	2341879	101.6	928063
Gross Weight	29555.9	248.9	7356702	107.5	3176484

Horizontal C.G. = $\frac{248.9 - 204.4}{165.3}$ = 26.9% M.A.C.

Vertical C.G. = 107.5 - 100 = 7.5" Above deck line

500 Gal. Bomber (4) 1000# Bombs - Crew Functional					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	11135.9	255.0	2839879	105.3	1172063
Gross Weight	31555.9	248.9	7854702	108.4	3420484

Horizontal C.G. = $\frac{248.9 - 204.4}{165.3}$ = 26.9% M.A.C.

Vertical C.G. = 108.4 - 100 = 8.4" Above deck line

500 Gal. Bomber (12) 100# Class (116#) Bombs - Crew Functional					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	8657.5	259.4	2245599	100.3	868599
Gross Weight	29077.5	249.7	7260422	107.2	3117020

Horizontal C.G. = $\frac{249.7 - 204.4}{165.3}$ = 27.4% M.A.C.

Vertical C.G. = 107.2 - 100 = 7.2" above deck line

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CHECKED

GROSS WEIGHTS (Cont'd.)

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
1000 Gal. Bomber (2) 1000# Bombs - Crew Functional					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	12323.4	258.2	3181408	114.0	1404677
Gross Weight	32743.4	250.3	8196231	111.6	3653098

Horizontal C.G. = $\frac{250.3 - 204.4}{165.3}$ = 27.8% M.A.C.

Vertical C.G. = 111.6 - 100 = 11.6" Above Deck Line

500 Gal. Torpedo (2) Mk XIII Torpedoes - Crew Functional					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Loads	11190.1	255.0	2853701	106.5	1192643
Gross Weights	31610.1	248.9	7868524	108.8	3440064

Horizontal C.G. = $\frac{248.9 - 204.4}{165.3}$ = 26.9% M.A.C.

Vertical C.G. = 108.8 - 100 = 8.8" Above deck line

500 Gal. (2) 1000# Bomber Less Bombs, Ammunition & Fuel-Crew Functional					
Gross Weight - 500 gal.Bomber with (2) 1000# Bombs - Crew Functional	29555.9	248.9	7356702	107.5	3176484
Less: 1000# Bombs (2)	-2000.0	249.0	-498000	122.0	-244000
Bow Gun Ammunition	- 80.0	26.8	- 2144	68.0	- 5440
Waist Gun Ammunition	- 377.6	393.0	-148397	53.0	- 20013
Tunnel Gun Ammunition	- 40.0	537.0	- 21480	63.7	- 2549
Fuel - 515 Gals.	-3090.0	270.7	-836463	138.3	-427347
Gross Weight	23968.3	244.1	5850218	103.4	2477136

Horizontal C.G. = $\frac{244.1 - 204.4}{165.3}$ = 24.0% M.A.C.

Vertical C.G. = 103.4 - 100 = 3.4" above deck line

785 Gal.Patrol with Smoke Tank Installation-Crew Functional (Not a Normal Ld					
785 gal.Patrol-Crew Functional	29238.5	250.1	7312046	109.0	3185850
Plus: Smoke Screen Tank Mk. V (1)	975.0	248.0	241800	120.0	117000
Bomb Rack Mk XXXV & Solenoid (1)	23.0	250.0	5750	135.0	3105
CO_2 Cylinder-Mk. V (1)	34.0	234.0	7956	50.0	1700
Bomb Chocks (1)	10.0	249.0	2490	135.0	1350
Gross Weight	30280.5	250.0	7570042	109.3	3309013

Horizontal C.G. = $\frac{250.0 - 204.4}{165.3}$ = 27.6% M.A.C.

Vertical C.G. = 109.3 - 100 = 9.3" above deck line

BY

CHECKED

Gross Weights (Cont'd.)

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
785 Gal. Patrol - Crew Battle					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	8818.5	269.3	2374561	107.8	950577
Gross Weight	29238.5	252.7	7389384	109.4	3199998

Horizontal C.G. = $\frac{252.7 - 204.4}{165.3}$ = 29.2% M.A.C.

Vertical C.G. = 109.4 - 100 = 9.4" Above deck line

1191 Gal. Patrol - Crew Battle - Full Fuel with Fuel Cells					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	11442.0	266.6	3050039	118.0	1349933
Gross Weight	31862.0	253.1	8064862	112.9	3598354

Horizontal C.G. = $\frac{253.1 - 204.4}{165.3}$ = 29.5% M.A.C.

Vertical C.G. = 112.9 - 100 = 12.9" Above deck line

500 Gal. Bomber (2) 1000# Bombs - Crew Battle					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	9135.9	264.8	2419217	103.0	941203
Gross Weight	29555.9	251.5	7434040	107.9	3189624

Horizontal C.G. = $\frac{251.5 - 204.4}{165.3}$ = 28.5% M.A.C.

Vertical C.G. = 107.9 - 100 = 7.9" above deck line

500 Gal. Bomber (4) 1000# Bombs - Crew Battle					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	11135.9	262.0	2917217	106.4	1185203
Gross Weight	31555.9	251.4	7932040	108.8	3433624

Horizontal C.G. = $\frac{251.4 - 204.4}{165.3}$ = 28.4% M.A.C.

Vertical C.G. = 108.8 - 100 = 8.8" Above Deck Line

500 Gal. Bomber (12) 100# Class (116#) Bombs - Crew Battle					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	8657.5	268.3	2322937	101.8	881739
Gross Weight	29077.5	252.4	7337760	107.6	3130160

Horizontal C.G. = $\frac{252.4 - 204.4}{165.3}$ = 29.0% M.A.C.

Vertical C.G. = 107.6 - 100 = 7.6" Above deck line

BY

CHECKED

GROSS WEIGHTS (Cont'd.)

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
1000 Gal. Bomber (2) 1000# Bombs - Crew Battle					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	12323.4	264.4	3258746	115.1	1417817
Gross Weight	32743.4	252.7	8273569	112.0	3666238

Horizontal C.G. = $\frac{252.7 - 204.4}{165.3}$ = 29.2% M.A.C.

Vertical C.G. = 112 - 100 = 12" above deck line

500 Gal. Torpedo (2) Mk XIII Torpedoes - Crew Battle					
Weight Empty	20420.0	245.6	5014823	110.1	2248421
Useful Load	11190.1	261.9	2931039	107.7	1204783
Gross Weight	31610.1	251.4	7945862	109.2	3453204

Horizontal C.G. = $\frac{251.4 - 204.4}{165.3}$ = 28.4% M.A.C.

Vertical C.G. = 109.2 - 100 = 9.2" above deck line

500 Gal. (2) 1000# Bomber Less Bombs, Ammunition & Fuel - Crew Battle					
Gross Weight for 500 gal. bomber less bombs, ammunition & fuel - Crew Functional	23968.3	244.1	5850218	103.4	2477136
Less: Functional Crew	-1260.0	220.7	-278100	55.1	- 69480
Plus: Battle Crew	+1260.0	280.4	+353344	65.6	+ 82620
Gross Weight	23968.3	247.2	5925462	103.9	2490276

Horizontal C.G. = $\frac{247.2 - 204.4}{165.3}$ = 25.9% M.A.C.

Vertical C.G. = 103.9 - 100 = 3.9" above deck line

785 Gal. Patrol-With Smoke Tank Installation-Crew Battle-(Not a Normal Load)					
Gross Weight for 785 gal. Patrol with smoke tank installation- crew functional	30280.5	250.0	7570042	109.3	3309013
Less: Functional Crew	-1260.0	220.7	-278100	55.1	- 69480
Plus: Battle Crew	+1260.0	280.4	+353344	65.6	+ 82620
Gross Weight	30280.5	252.5	7645286	109.7	3322153

Horizontal C.G. = $\frac{252.5 - 204.4}{165.3}$ = 29.1% M.A.C.

Vertical C.G. = 109.7 - 100 = 9.7" Above deck line

Most Forward Flying C.G.					
Gross Weight for 1191 gal. Patrol Crew Functional	31862.0	250.7	7987525	112.5	3585214
Less: Fuel 1206 gals.	-7236.0	266.6	-1929118	145.3	-1051391
Waist Gun Ammunition	- 377.6	393.0	-148397	53.0	- 20013
Tunnel Gun Ammunition	- 40.0	537.0	- 21480	63.7	- 2548
Gross Weight	24208.4	243.2	5888530	103.7	2511262

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CHECKED

Horizontal C.G. = $\frac{243.2 - 204.4}{165.3}$ = 23.5% M.A.C.

Vertical C.G. = 103.7 - 100 = 3.7" above deck line

MODEL PBY-5A AIRPLANE REPORT NO. ZM-28-052

GROSS WEIGHTS (Cont'd.)

	Weight	Horizontal Arm	Horizontal Moment	Vertical Arm	Vertical Moment
Most Aft Flying C.G.					
Gross Weight for 1191 gal. Patrol					
Crew Battle	31862.0	253.1	8064862	112.9	3598354
Less: Bow Gun Ammunition	- 80.0	26.8	- 2144	68.0	- 5440
Gross Weights	31782.0	253.7	8062718	113.0	3592914

Horizontal C.G. = $\frac{253.7 - 204.4}{165.3}$ = 29.8% M.A.C.

Vertical C.G. = 113 - 100 = 13" above deck line

BY

CHECKED

MODEL PBY-5A AIRPLANE REPORT NO ZW-28-052

AUTHORIZED CHANGES

Weight Empty

Changes	Reference	Allocation	Weight
A - Substitute detail Spec.SD-205-5 of 10/25/39 for type Spec. SD-116-25 of 9/6/39	Bu S&A Restr.letter NOs. 70496-SPM of 1/24/40 to C.A.C.		
B - Install Government furnished Mk.XXXV-6 bomb rack in lieu of the Mk. XXXV-1 and -2 bomb racks now specified for the bomb and torpedo installation	Bu S&A Conf.letter NOs. 70496-SPM of 12/29/39 to C.A.C.	Wing	+ 6.0
C - Install Government furnished type DW Direction Finder in lieu of DV remote control	Bu S&A Restr.letter NOs.70496-SPM of 1/12/40 & C.A.C.Letter FWD:R, F-42,M.Misc.#485 of 12/18/39 to INA, S.D.		
D - Eliminate provision for installation of the two(2) .30 cal.guns at the side waist gun stations. The weight empty performance and delivery guarantee will not be changed	Bu S&A Conf.letter NOs. 70496 SPM of 4/11/40 and C.A.C. letter RHR: 70496-#8 of 2/19/40 to INA, S.D.		
E - Eliminate the installation of the bomb release radio signal	Bu S&A Conf.letter NOs. 70496-SPM of 5/6/40 Schedule 500-1189	Electrical	- 1.5
G - Provide and install modified bomber's window cover as shown on C.A.C.photograph C-28001 (5.3# vs 3.3#)	Bu S&A Conf.letter NOs. 70496-SPM of 6/17/40 & C.A.C.Letter FWD:R,F-34 70496-#145 of 4/29/40, to INA, S.D.(1560)	Hull	+ 2.0
H - Provide and install propeller anti-icer fluid tank and pump, in accordance with C.A.C.Drwg. 28P5060	Bu S&A Restr.letter NOs. 70496(SPM) of 6/18/40 & C.A.C.letter FWD:R, F-34,70496-#124 of 4/15/40	Hull Propeller Wing	+ 0.5 + 2.4 - 0.5
I - Provide and install canvas boots for control yoke in accordance with C.A.C.Drwg.No.28F1626	Bu S&A Restr.letter NOs. 70496 (SPM) of 8/22/40 & C.A.C.letter FWD:R, F-34, 43087-#1088, 70496-#7 of 1/26/40	Furnishings	+ 0.6
J(a)-Incorporate changes in waist gun enclosure in accordance with CAC Drwgs.28R5016,28R5022, 28R5024, 28R5025. (b)-Provide & install revised bomber's seat and knee pad,in accordance with CAC Drwg.28R5020.	Bu S&A Conf.letter NOs. 70496 SPM of 6/28/40 (2470) & CAC letter FWD: R, F-13, 70496-#157 of 5/17/40 to INA,S.D.(1847)	Hull Furnishings BY Hull CHECKED Furnishings	+29.0 +24.2 + 1.0 + 2.1

AUTHORIZED CHANGES (Cont'd.)

Weight Empty (Cont'd.)

Changes	Reference	Allocation	Weight
K - Install navigator's window in accordance with CAC Drwg. No.28B5200 (4.3# vs 1.8#)	Bu S&A Restr.ltr.NOs. 70496(SPM) of 7/1/40 & CAC ltr.FWD:R,F-1, 70496-#108 of 4/2/40 to INA, S.D.(1125)	Hull	+ 2.5
M - Provide a radio & electrical installation which incorporates certain deviations from the specification. The weight empty, performance and delivery guarantees will not be changed.	Bu S&A Conf.ltr.NOs. 70496(SPM) of 8/2/40 & CAC Ltr.F-36,70496-#180, FWD:R of 6/7/40		
N - Provide & Install access doors on upper wing surface and modify bulkheads #2 and 4-1/2	Bu S&A Conf.ltr.NOs. 70496 SPM of 9/18/40 & CAC Ltr.,FWD:R,F-27 70496-#309 of 9/27/40 Bu S&A Conf.ltr.NOs. 70496 SPM of 10/28/40 (4473)	Wing	+37.5
O - Provide and install necessary parts including installation of GFM for breather type oxygen equipment, as per CAE Drwg. 28U5003, change "A"	Bu S&A Conf.ltr.NOs. 70496(SPM) of 8/9/40 & CAC Ltr.FWD:R,F-34, 70496-#218 of 7/11/40	Furnishings	+68.1
P - Provide and install a main fuel line shut-off valve installation in accordance with CAC Drwg.28P5075.	Bu S&A Restr.ltr.NOs. 70496(SPM) of 8/19/40 & CAC ltr.FWD:R,70496-#221 of 7/13/40	Fuel System	+ 3.5
Q - Incorporate necessary modifications for conversion to amphibian type airplanes	CAC ltr.70496-#214 of 7/5/40 & Bu.S&A ltr.NOs.70496SPM of 10/18/41	Hull Landing Gear & Ret.Mech Surface Con. Furnishings Electrical	680.0 2028.0 20.0 29.0 20.0
Q2- Provide and install a windshield washer parts in accordance with CAC Drwg. No.28B5229.	Bu S&A ltr.NOs.70496 (SPM) of 8/27/40(3446) & CAC ltr.FWD:R,F-34, 70496-#197 of 6/21/40 to INA,S.D.(2323)	Furnishings	+ 5.3
Q3- Install Government furnished sectional radio transmission lines for the Model 5A instrument landing equipment	Bu S&A Restr.Ltr.NOs. 70496(SPM) of 8/28/40 (3443) & CAC Ltr.FWD:R, 70496-#230 of 7/24/40 to INA,S.D.	Instruments	+ 7.5

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AUTHORIZED CHANGES (Cont'd.)

Weight Empty (Cont'd.)

Changes	Reference	Allocation	Weight
Q4- Provide and install necessary parts for the installation of a GF pilot's type interphone station box	Bu S&A Conf.ltr.NOs. 70496(SPM) of 8/30/40, (3508) & CAC ltr. FWD:R,F-36,70496-#237 of 8/1/40	Electrical	+ 2.8
Q5- Furnish & install necessary parts to permit lubrication of the cockpit controlled rudder lock	Bu S&A Restr.ltr.NOs. 70496(SPM) of 10/1/40 & CAC Ltr.FWD:R,70496-#264 of 8/20/40	Surface Cont.	+ 1.0
Q6- Provide dual seal inner tubes for nose wheel, in lieu of standard type now specified.	CAC Ltr.70496-#297 of 9/13/40 & Bu S&A Restr. letter 70496-SPM of 10/17/40	Landing Gear	+10.0
Q7- Modify the electrical installation for the bombsight automatic control system.	Bu S&A Restr.ltr.NOs. 70496(SPM) of 11/19/40 & CAC ltr.FWD:R,70496-#316 of 10/8/40 to INA, S.D.	Electrical	- 0.9
Q8- Furnish & install necessary parts to provide for the installation of protection for fuel against gunfire	Bu S&A Conf.ltr.NOs. 70496(SPM) of 11/30/40 (5024) & CAC letter FWD:R,70496-#312 of 10/4/40	Wing Fuel System	+143.3 + 25.8
Q9- Provide and install necessary braces in the engine compartment to reduce vibration of engine accessories.	Bu S&A Restr.Ltr.NOs. 70496 (SPM) of 5/2/40 & CAC Ltr.70496-#325, 10/28/40	Starting Sys. Electrical	+ 6.0 + 5.0
Z - Provide and install necessary parts for a mooring gear quick release device, in general accordance with CAC Drwg.No.28R5063.	Bu S&A Restr.Ltr.NOs. 70496 of 12/23/40 & CAC ltr.70496-#329 of 11/6/40	Anchor & Handling Gear	+ 4.0
Q10-Provide and install a revised surface control lock for use with the armored pilot's seat, in accordance with CAC Drwg. 28R5058	Bu S&A Conf.ltr.NOs. 70496 of 2/3/41 & CAC letter 70496-#337 of 11/22/40	Hull	+ 1.0
Q11-Install self-sealing fuel cells and interconnecting tubing	Bu S&A Restr.ltr.NOs. 70496 of 4/12/41(2533) & CAC ltr.70496-#733 of 8/25/41	Wing Fuel System	17.0 1095.5
Contractor to furnish self-sealing fuel lines to be installed by Navy personnel.	S&A Restr.Ltr.NOS. 70496-of 8/29/41 & CAC ltr.FWD:R,70496-#670 of 7/21/41	Fuel System	+35.0

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AUTHORIZED CHANGES (Cont'd.)

Weight Empty (Cont'd.)

Changes	Reference	Allocation	Weight
Contractor to furnish parts necessary for a low pressure oxygen system in lieu of high pressure system.	S&A Restr.ltr.NOs. 70496 SPM of 6/16/41 & CAC ltr.70496-#515 of 4/29/41	Furnishings	+20.0
Torpedo Hoisting Sling-Reworked	S&A Conf.ltr.NOs. 70496-& CAC Ltr. 70496-#579 of 5/27/41	Furnishings	+ 3.0
Revolving Circular Windshield lock,to be furnished to and added by service personnel	S&A Conf.ltr.NOs. 70496-SPM 6 of 6/28/41, CAC Ltr.70496-#567A of 6/16/41	Hull	+ 1.5
Stewart-Warner Heating System to be installed by CAC personnel at North Island	Bu Aer Dispatch 22222 of Sept.1941 BuAer Conf.letter of Sept.26 (7515)	Furnishings	+145.0
Complete Government furnished armor plating to be installed by CAC personnel at North Island	BuAero Dispatch 22222 of Sept.1941. BuAer Conf.ltr.of Sept.26 (7515)	Hull Wing Furnishings	+301.9 +89.1 +272.0
Total			5145.2

BY

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AUTHORIZED CHANGES (Cont'd.)

Useful Load

Changes	Reference	Allocation	Weight
B - Install Government furnished Mk.XXXV-6 bomb rack in lieu of Mk XXXV-1 & -2 bomb racks now specified for the bomb & torpedo installations No.11 and on	Bu S&A Conf.ltr.NOs. 70496 SPM of 12/29/39	Torpedo Instaln.	*(+12.0)
C - Install Government furnished type DW direction finder in lieu of the DV remote ~~EK~~ control type now specified.	Bu S&A Restr.Ltr.No. 70496 SPM of 1/12/40 & CAC ltr.FWD:R,F-42, N.Misc.485 of 12/8/39, to INA,S.D.	Radio Equipment	-19.3
O - Provide and install necessary parts including installation of GFM items for breather type oxygen system	Bu S&A Conf.ltr.NOs. 70496 SPM of 8/9/40 & CAC ltr.FWD:R,F-34, 70496-#218 of 7/11/40	Misc. Equipment	+307.5
Q4- Provide and install necessary parts for the installation of an added GF pilot's type interphone station box on the underside forward end of the radio operator's Table	Bu S&A Conf.ltr.NOs. 70496-SPM of 8/30/40 (3508) & CAC ltr. FWD:R,F-36,70496-#237 of 8/1/40	Interphone	+ 3.1
Oxygen Installation-Low pressure system in lieu of High pressure	S&A Restr.ltr.NOs. 70496 SPM of 6/16/41 & CAC ltr.70496-#515 of 4/29/41	Miscellaneous Equipment	+19.5
Torpedo Installation starting mechanism and stop reworked	S&A Conf.ltr.NOs.70496 & CAC ltr.70496-#579 of 5/27/41	Torpedo Installation	*(4.4)
Total Useful Load applicable to Patrol & Bomber Loads			+310.8

*Applies to Torpedo Useful Load Only

BY

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MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

Government Furnished Weight Empty Items

Actual Vs. Specification Weights

Item	Spec. Weight	Actual Weight	Actual vs. Spec.
Power Plant			
(2) Pratt & Whitney Model R-1830-82 engines geared 16 to 9	2960.0	2925.0	-35.0
(2) Hand-electric inertia starters Eclipse series 40 each with integral booster coil (2) cranks and (1) extension	102.0	105.3	+ 3.3
(2) Propeller assemblies (controllable pitch 12'0" dia. full feathering 3-blades)(less controls)	790.0	793.0	+ 3.0
(2) Engine driven fuel pumps with integral syphon relief and by-pass valves	5.0	4.4	- 0.6
(2) constant speed propeller governor assemblies	12.0	12.5	+ 0.5
(2) Sets flexible pedestal mounts	62.0	42.4	-19.6
(2) Sets pumps, switches & solenoid relays	47.6	45.4	- 2.2
Instruments			
(1) Automatic flight control unit exclusive from bombsight	143.0	143.0	
(2) Artificial horizon indicators (less mounts)	9.8	8.6	- 1.2
(4) Airspeed Indicators	5.0	2.7	- 0.3
(2) Turn & Bank Indicators	2.6	2.6	
(5) Altimeters	5.0	5.3	+ 0.3
(2) clocks (elapsed time)	2.0	1.7	- 0.3
(2) Composses Mk. IV	6.6	5.8	- 0.8
(2) Electric Tachometer Generators (4) Indicators	13.1	13.6	+ 0.5
(2) Inclinometers	0.6	0.4	- 0.2
(4) Manifold pressure gages	4.0	3.8	- 0.2
(2) Directional gyros without mounts	8.0	7.3	- 0.7
(2) Climb Indicators	3.0	1.7	- 1.3
(2) Suction Regulating valves	1.6	1.5	- 0.1
(2) Single point thermocouple units	6.8	6.3	- 0.5
(3) Air thermometer, elec.less bulbs	3.8	2.8	- 1.0
(1) Electric tachometer synchronizer unit	0.4	0.5	+ 0.1
(1) Clock standard	0.6	0.4	- 0.2
(1) Electrically heated pitot static tube	1.0	0.7	- 0.3
*(2) Engine gage units	7.5	3.5	- 4.0
(1) Vacuum gage	0.5	0.3	- 0.2
**(1) Radio transmission line for Model ZA Installation hand equip.	6.3	6.3	
Electrical Equipment			
(2) Generators, Type NEA-2D	90.0	82.1	- 7.9
(1) Selector Switch, Type B-1	1.0	1.0	

BY

CHECKED

APPROVED

MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

Government Furnished Weight Empty Items

Actual vs. Specification Weights

Item	Spec. Weight	Actual Weight	Actual vs. Spec.
Electrical Equipment (continued)			
(2) Batteries type S.34 and (2) S-17 batteries with integral Case (2S-34=77.8 & 2S-17=49.0)	126.0	126.8	+ 0.8
(1) Auxiliary power unit NEP with bilge pump, generator, control box and float chamber	120.0	128.0	+ 8.0
(2) Control boxes Type NF-1D	10.0	12.6	+ 2.6
(2) Running Lights Type F	1.2	1.2	
(10) Interior Lights B-25 (with lamps)	3.0	3.0	
(11) Receptacles Type C-3	1.0	1.0	
(4) Indicator Lights B-328CB-33 (with lamps)	0.5	0.5	
(1) Exterior light D-22 (with lamps & reflector)	0.3	0.3	
(2) Lights D-25 (with lamp reflector & globes)	0.6	0.6	
(4) Instrument Lights A-21 (with lamps)	0.5	0.5	
(1) Selector Switch, Type B-1	1.0	1.0	
***(1) NAF-1090 switch	0.5	0.5	
Furnishings			
(2) Bomb Release Handles, Mk. XXIX	3.2	2.5	- 0.7
(1) Flare Release Handle M-2 (double)	0.9	0.7	- 0.2
(4) Very pistol cartridge cont. Mk. II (B.O.162676)	2.4	2.3	- 0.1
(5) Pilot type safety belts	15.0	14.4	- 0.6
(4) Gunner type safety belts	10.0	11.3	+ 1.3
(4) Bunk safety belts	7.6	4.9	- 2.7
*Stewart-Warner Heaters (7) & Blower (1)	101.7	101.7	0
Δ Armor Plated pilot's seats	292.0	292.0	0
Hull			
Δ Armor Plating at bow gun	53.9	53.9	0
Δ Armor Plating at bulkhead	18.3	18.3	0
Δ Armor Plating at Blister Turrets	111.9	111.9	0
Δ Armor Plating at Tunnel Gun	117.8	117.8	0
Wing			
Δ Armor Plating for fuel protection	89.1	89.1	0
Total	5387.2	5326.7	-60.5

* 2 Engine gage units used in lieu of following spec items:
2 Fuel pressure gages-Spec. weight = 2.5#
2 Oil pressure gages- Spec. weight = 2.5#
2 Oil temperature gages-Spec. Weight= 2.5#

** Install Government furnished sectional radio transmission lines for Model ZA Instrument landing equipment Spec. weight increase 6.3# see Bu. S&A rest. letter No. 70496-(SPM) of 8-28-40

BY

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MODEL PBY-5A AIRPLANE. REPORT NO. ZW-28-052

*** Modify the electrical installation for the bombsight automatic control system NAF1090 switch added = 0.5#

O Stewart-Warner heaters (7) and blower (1) to be furnished by Government and installed by C.A.C. personnel. See BuAer Dispatch 22222 of Sept. 1941 and BuAer Conf. letter of September 26 (7515)

Δ Armor plating and attaching parts to be furnished by Government and installed by C.A.C. personnel. See BuAer dispatch 22222 of Sept. 1941 and BuAer. Conf. letter of Sept. 26 (7515)

BY_____

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APPROVED_____

MODEL PBY-5A AIRPLANE REPORT NO. ZW-28-052

ACTUAL vs GUARANTEED WEIGHT EMPTY

	Original Contract Guaranteed Weight Empty	Auth. Chgs. "A" thru AB Excluding F, L, & X, also chgs. to be accomplished in service	G.F.N. Over & Under Weight	Final Guaranteed Weight Empty	Actual Weight Empty per Spec. & Contract Changes
Wing	4291	292.4		4583.4	4543.3
Tail	499			499.0	516.4
Hull	3322	1019.4		4341.4	4260.9
Floats & Retracting Mechanism	472			472.0	460.1
Nacelles	442		-19.6	422.4	496.8
Landing Gear					
Main		1520.		1520.0	1490.8
Nose		298		298.	276.6
Retracting Mechanism		220.		220.	195.7
Engines	2960.		-35.0	2925.0	2925.0
Engine Accessories	270		- 0.6	269.4	282.5
Power Plant Controls	127.		- 2.2	124.8	110.0
Propellers & Governors	802	2.4	+ 3.5	807.9	* 818.4
Starting System	108.	6.0	+ 3.3	117.3	117.6
Oil System	27.			27.	22.4
Fuel System	69.	1159.8		1228.8	1224.6
Instruments	133.	7.5	-10.4	130.1	125.7
Surface Controls	405	21.0		426.0	422.3
Furnishings	827.	569.3	- 3.0	1393.3	1234.2
Electrical Equipment	659	25.4	+ 3.5	687.9	776.1
Anchor & Handling Gear	121	4.0		125.0	120.6
Total	15534.	5145.2	-60.5	20618.7	20420

Net Underweight = 20618.7 - 20420 = 198.7#

*Under actual weight empty, the anti-icer provisions are reallocated to propellers and governors.

BY

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Comparison of Specification and Actual Useful Loads Weights which Differ

Item	Actual Weight	Specification Weight
Interphone Installation	38.6	21.4
Direction Finding Loop	15.8	16.7
Bomb Chocks	11.5	*
Torpedo Chocks & Supports	128.5	317.8
Bomb Racks & Solenoids (4)	98.1	92.0

*Spec. Weight of Bomb Chocks:

1000# and 500# bomb loads	10.4
12-100# Bomb Load	0
2-Mk. XIII Torpedoes	0
Patrol Loads	0

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APPENDIX I

50% vs. 100% Fuel Protection - No Fuel Protection Nor Armor Plating vs. 100% Fuel Protection & Armor Plating

The following tabulation indicates the weight and C.G. of items added and/or eliminated from the report weight empty of Page (100% fuel protection and 100% armor plating) for:

(a) 50% vs. 100% Fuel Protection
(b) No fuel protection nor armor plating vs. 100% fuel protection and armor plating

	Weight	Horizontal Arm	Moment
(a) 50% vs. 100% Fuel Protection			
Self Sealing Fuel Cell Items, etc.			
Eliminated-(1) Side			
Fuel cells (5)	-532.5	269.0	-143243
Interconnecting tubing	- 25.0	269.0	- 6725
Vents & Guards	- 4.8	269.0	- 1291
Fuel cell liners, wooden backing plates & canvas curtains	- 90.0	269.0	24210
Dump Valve Hole Cover	- 0.5	265.0	133
	(-652.8)	(269.0)	(-175602)
Items Added (1) Side			
Purging System	+ 27.0	314.0	+ 8478
Dump Valve & Control	+ 5.5	265.0	+ 1458
Dump Valve Duct	+ 15.0	330.0	+ 4950
	(+ 47.5)	(313.4)	(+14886)
(a) Total	-605.3	265.5	-160716
(b) No Fuel Protection Nor Armor Plating vs. 100% Fuel Protection & Armor Plating			
Items Eliminated			
Self-Seal Fuel Cell Install.			
Fuel Cells(10)	-1065.0	269.0	-286485
Interconnecting tubing	- 50.0	269.0	- 13450
Vents & Guards	- 9.6	269.0	- 2582
Fuel Cell Liners, Wooden Backing Plates & Canvas Curtains	- 180.0	269.0	- 48420
	(-1304.6)	(269.0)	(-350937)
***Armor Plating Install-Less Attach. Parts**			
Armor Plating @ Tunnel Gun	-105.4	539.0	- 56811
Armor Plating @ Waist Gun Turret	-100.6	426.0	- 42856
Armor Plating for Fuel Protection	- 93.7	285.8	- 26779
Armor Plating@ Pilot Seats	-292.0	116.0	- 33872
Armor Plating @ Bow Gun	- 49.6	22.0	- 1091
	(-641.3)	(251.7)	(-161409)
(b) Total	-1945.9	263.3	-512346

* Provision for armor plating is not readily removable; therefore it is not removed for the above condition.

BY_____

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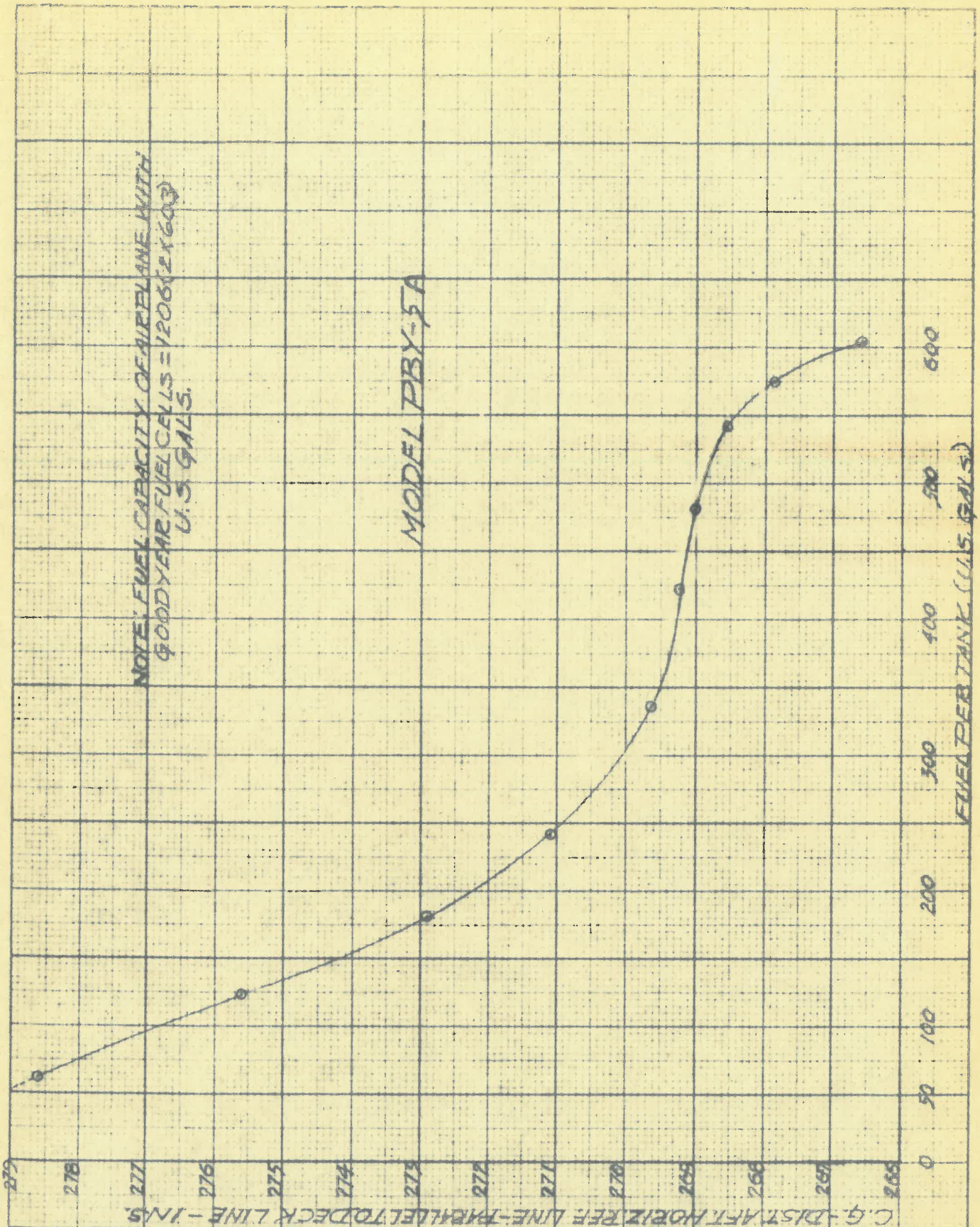
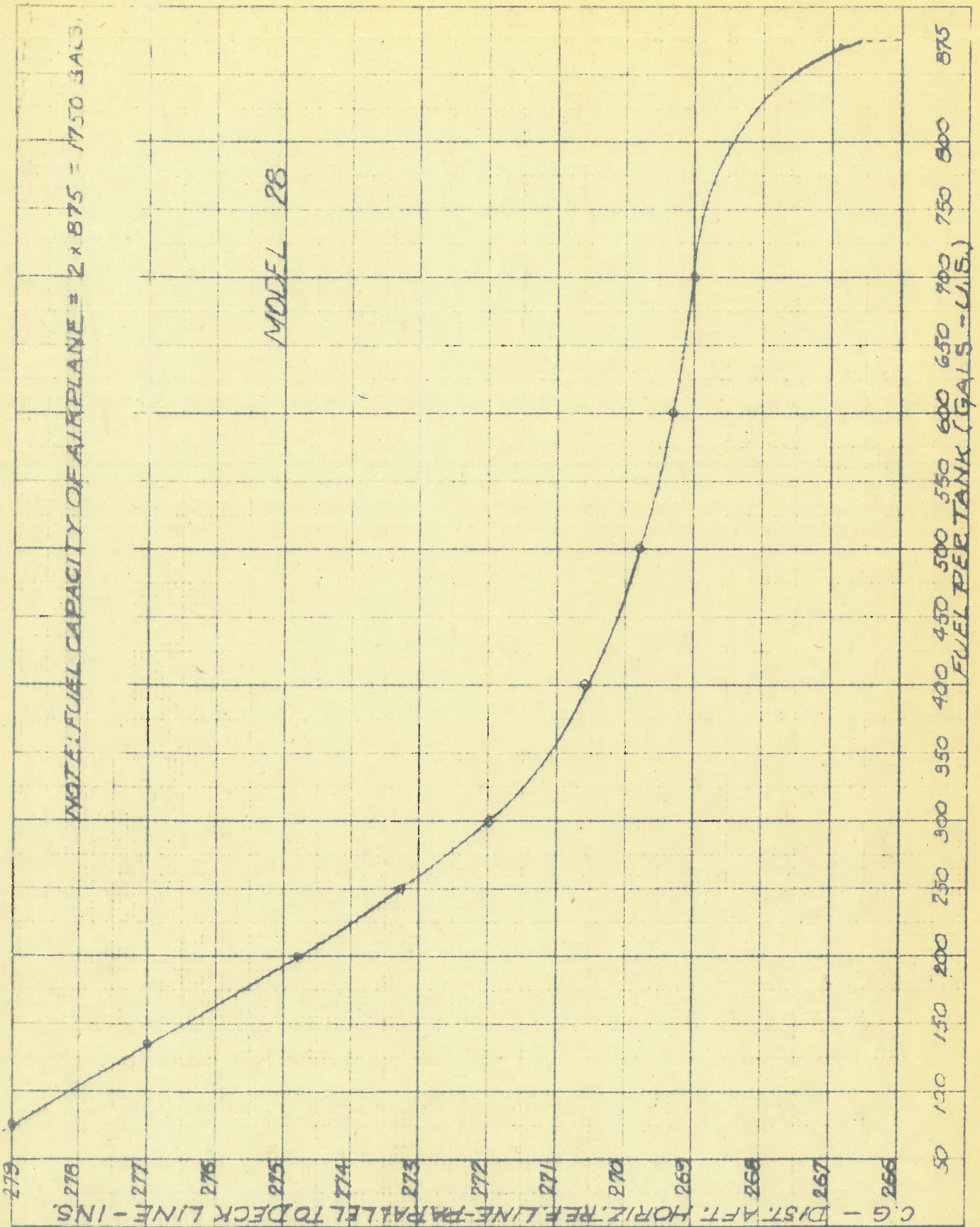


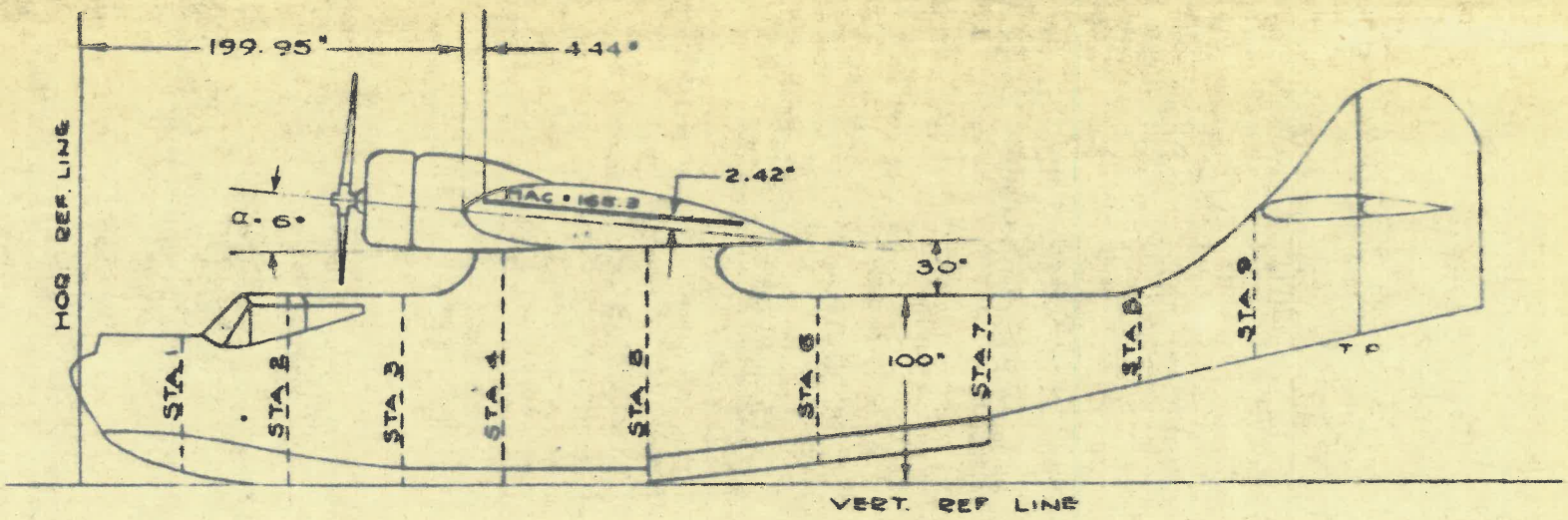
CALCULATED BY			VARIATION OF HORIZ. C.G. OF FUEL — WITH SELF SEALING FUEL CELLS DECK LINE LEVEL	PAGE
TRACED BY	M.N.S.	7-1541		DOC. NO.
CHECKED BY				
APPROVED BY			CONSOLIDATED AIRCRAFT CORPORATION LINDBERGH FIELD, SAN DIEGO, CALIF.	MODEL
APPROVED BY				

FORM 150R



CALCULATED BY			VARIATION OF HORIZ. C.G. OF FUEL - INTEGRAL FUEL TANK - DECK LINE LEVEL	PAGE
TRACED BY	M.N.S.	2-11-41		DOC. NO.
CHECKED BY				
APPROVED BY			CONSOLIDATED AIRCRAFT CORPORATION LINDBERGH FIELD, SAN DIEGO, CALIF.	MODEL PBY's
APPROVED BY				

FORM 1502



DISTANCE IN INCHES AFT OF H.R.L			
STA .33	22.125	STA 5.75	364.810
.66	38.750	6.00	385.750
1.00	58.750	6.20	406.130
1.33	74.750	6.40	426.500
1.66	98.750	6.60	446.750
2.00	122.750	6.80	467.150
2.50	146.750	7.08	487.500
3.00	170.750	7.25	505.500
3.33	190.000	7.50	523.500
3.66	209.410	7.75	543.500
4.00	228.750	8.00	563.500
4.25	247.000	8.33	585.500
4.50	265.380	8.66	607.500
4.75	283.690	9.00	629.500
5.00	302.000	9.50	655.500
5.25	322.940	T.P.	687.500
5.50	343.880		

MODEL 28 (PBY-5)

STATION DIAGRAM

2-11-40 BY L.H. LISTER

CHECK S.H. AVERY

CONSOLIDATED AIRCRAFT CORP. SAN DIEGO, CA.